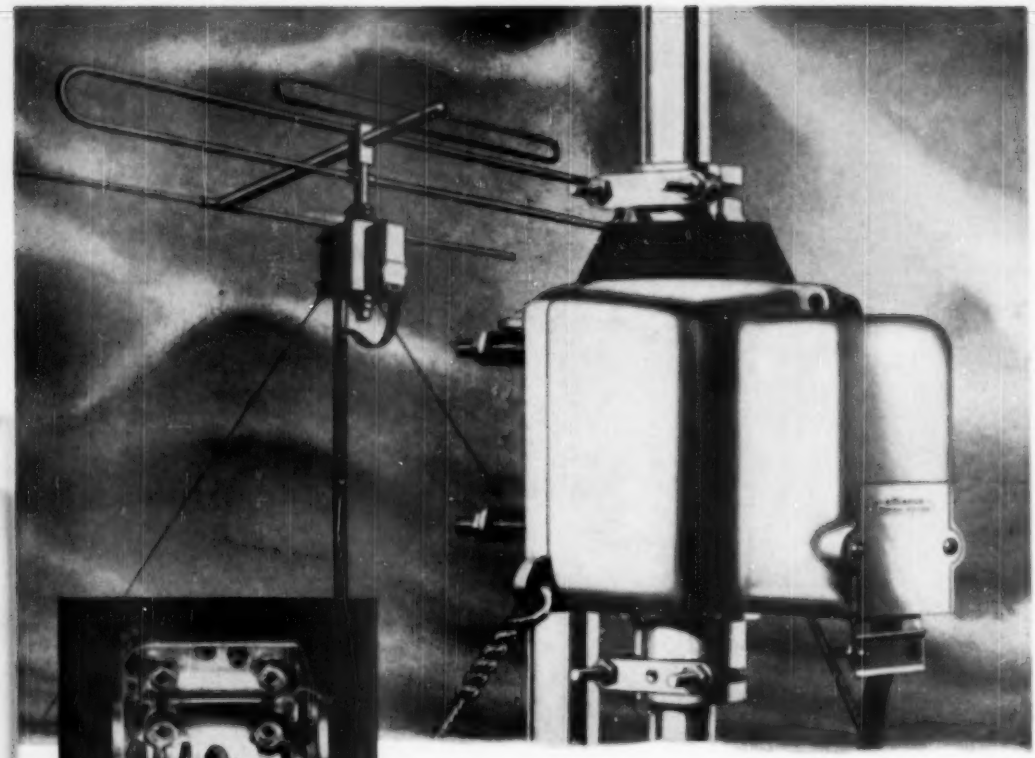
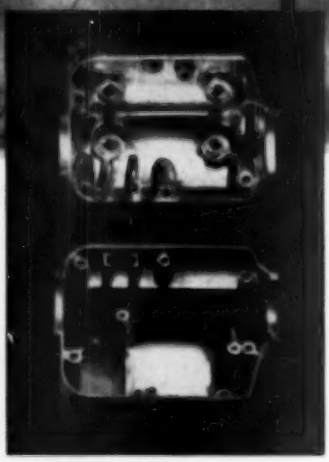
DIE CASTINGS

INCLUDING A SPECIAL FINISHING SECTION

THE PRODUCT DESIGN MAGAZINE FOR USERS AND POTENTIAL USERS OF DIE CASTINGS





4 REASONS WHY

Monarch Zinc Die Castings were selected to house the complete Rotator Assembly.

Precision-engineered
Maximum strength
Weather-resistance
Competitive price

*TENNA-ROTOR is a product of Alliance Manufacturing Company, Alliance, Ohio.

Controlled Direction!

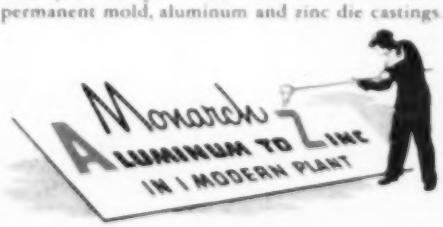
Yes . . . complete control because this TV antenna can be turned completely around to look any desired television transmitter "right in the eye". How? With a TENNA-ROTOR* which, with an assist from a simple chair-side electrical control, enables you to turn the antenna in a complete arc of 360°. The result? Greatly improved range, utility and performance of any TV or FM receiver.

Monarch Men understand directions, too! Our instructions were to provide an attractive and durable zinc die cast housing that would completely protect TENNA-ROTOR's delicate and sensitive inner mechanism from every hazard including weather and corrosion. Other basic requirements included closest dimensional accuracy to facilitate every step of production line assembly, installation and service.

Monarch precision-engineered zinc die castings meet every specified requirement accurately and on time. We can do as much for you. Write, wire or call us today for complete data on Monarch aluminum permanent mold, aluminum and zinc die castings.

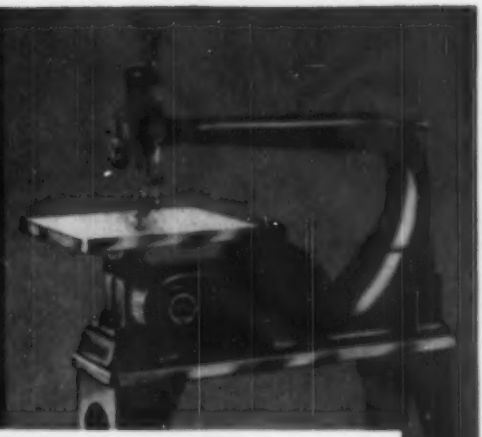
NEW SERIES OF 12 TECHNICAL BULLETINS

Edited for design and production engineers by Monarch's chief engineer, these fact-packed bulletins . . . issued at monthly intervals . . . discuss vitally important phases of the permanent mold and die casting processes. Upon request these bulletins will be addressed to your personal attention. Handsome binder furnished free.



MONARCH ALUMINUM MFG. COMPANY • Detroit Avenue at West 93rd Street, Cleveland 2, Ohio

DIE CASTING
produces parts and products in "jig-time"



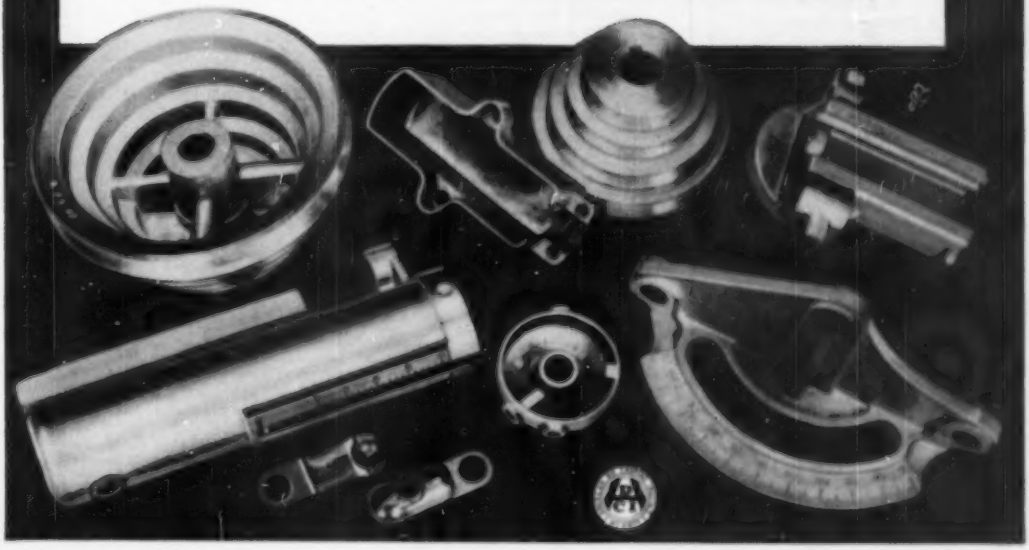
CASE HISTORIES FROM MT. VERNON FILES

Rapid production—that's die casting's "middle name"; because any product, simple or complex, can be produced almost instantly by die casting . . . and time-consuming machining operations are reduced to a minimum or eliminated, entirely.

Look at these components of the new Walker-Turner 24-inch, 4-speed jig saw; intricate shapes—with bosses, holes, runners, guides; pulley sheaves for variable speed drives; parts bearing graduated scales. All are produced rapidly by Mount Vernon—so accurately, they require little or no machining; so clean, they can be adapted to any type of finish.

Yes, die casting means cost-cutting all along the line—savings in time, effort and material that team to slice unit costs.

Have you weighed your present manufacturing procedure against the many advantages of die casting? If not, consult with us. We feel confident we can show you the way to new production economies and product improvements—profitable operation in today's highly competitive market.



FEBRUARY 1950
Vol. 8 No. 2

DIE CASTINGS

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COVER—Standard procedures have been developed for the production line finishing of aluminum. In addition to the popular mechanical finishes based on the natural bright color of aluminum, there are practical methods for painting, plating, anodizing and coloring aluminum die castings. A brief survey of the principal types of finishes for aluminum begins on Page 45.

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here's how

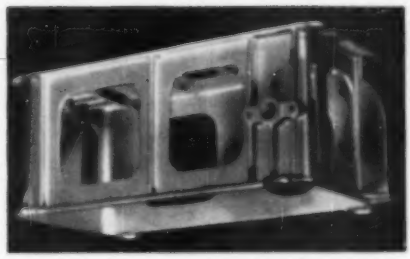
MAGNESIUM DIE CASTINGS

solve many problems.

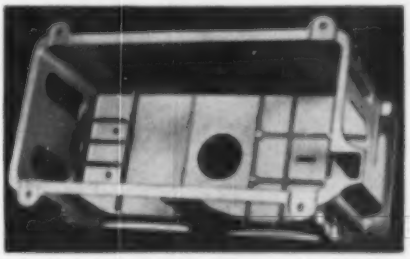
Priced Competitively with other Materials!

You don't have to pay premium prices to get the many advantages offered by magnesium die castings. In most cases, magnesium die castings are priced competitively with those in other materials and in some cases they are cheaper.

Magnesium die castings are long past the experimental stage. A wide range of applications has proved magnesium a versatile and economically sound die casting material.



Complicated Coring?



Dow can do it in Magnesium!

Complicated coring presents fewer problems with magnesium because magnesium die casting alloys do not solder to the die. The universal power tool base shown above was successfully cast in magnesium although product design requirements called for *five moveable cores in the die!* Magnesium's lightness and castability over large projected areas are also demonstrated in this casting. The over-all dimensions of the base are 14¾" x 5½" x 8", yet it weighs only 37 oz.

There are many reasons for the growing acceptance of magnesium die castings. They do not "creep" or "grow"—better tolerances are obtainable. In many cases you can get better rigidity with no weight penalty. Magnesium's extra lightness is a plus value. Any machining required can be done faster—magnesium is the easiest of all die casting alloys to machine.

When you design die castings, profit from the advantages offered by magnesium die casting alloys. Call in a Dow representative for expert assistance. Use Dow's production facilities for quality die castings at competitive prices.

Write to Dept. MG-3

Magnesium Division
THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Atlanta
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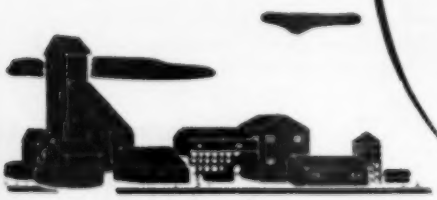
a reliable source for die casting requirements



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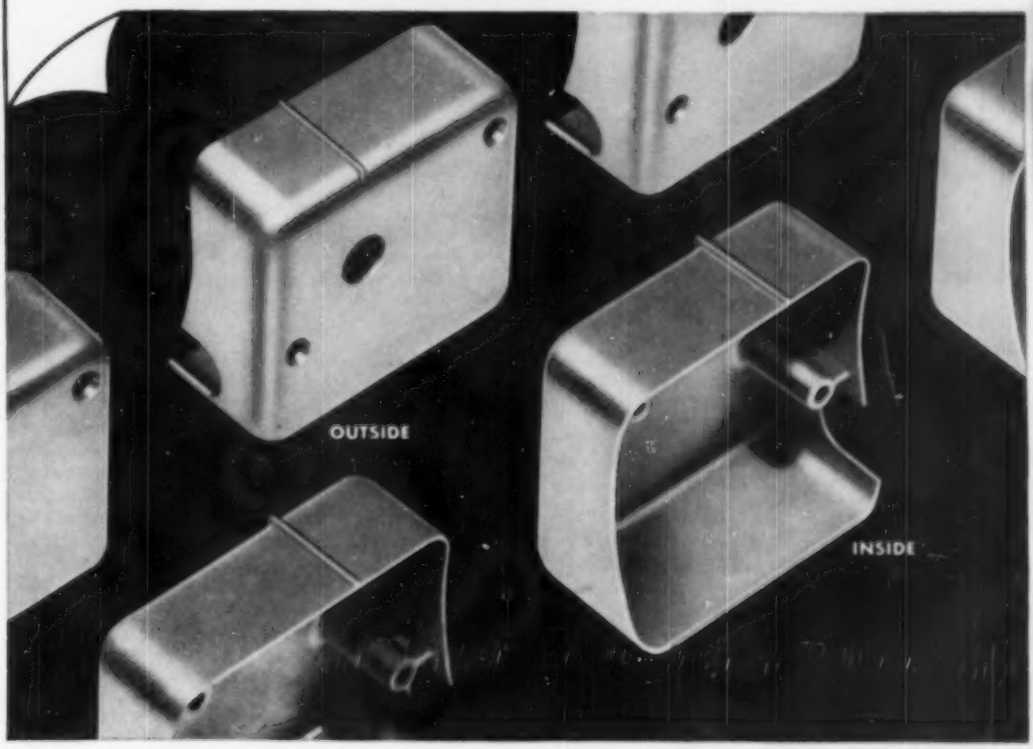
EARMARKS OF QUALITY AT LOW COST WITH MADISON-KIPP ZINC AND ALUMINUM DIE CASTINGS

Designers of many home appliances have a valuable formula for adding the "quality look" at minimum cost.

The switch cover here illustrated is a good example of this type of intelligent designing. A "tinny" cover would definitely detract, whereas a well-designed die cast cover provides a prominent earmark of quality. The functional bosses, holes, index pointer, and perfect contour fit are plus values.

Designers who have questions in reference to die castings are invited to send their letters to our home office in Madison, Wisconsin.



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It's a lot easier to adopt Die Slick as your standard die lubricant than to fuss around with home-made concoctions . . . AND WHAT SAVINGS YOU MAKE—in down-time, in die repairs, in jobs sent out right, on time.

Die Slick has proved, thousands of times, that it consistently prevents sticking and scoring, stops "soldering," assures better castings and more of them in less time.

The cost is trifling. Five grades suit all requirements, come in one and five-gallon cans, or 55-gallon drums, ready for use.

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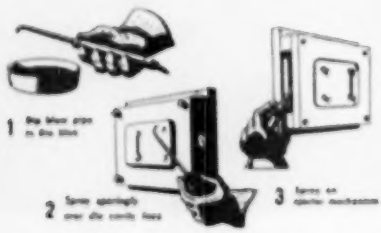

You'll get best results from Die Slick when you use it sparingly, and give the dies a chance to become "conditioned" by using it consistently.

While 78% of all die casters now use Die Slick, OUR ORIGINAL TRIAL OFFER still goes: send for a week's supply and if it does not satisfy you completely we'll cancel the invoice.

G. W. Smith & Sons, Inc.
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OK. Send us a supply of Die Slick to try on . . . zinc; . . . aluminum; . . . magnesium; . . . brass die casting. If we are not fully satisfied, we understand you will cancel the invoice.

Name ..... **Title** .....

Company .....

Address .....

LETTERS to the Editor

SALT SHAKER TOPS

We are interested in chrome finished metal tops for salt and pepper shakers and would ask if you would be kind enough to please advise us the names of a few firms who might manufacture this item.—I. C.

We turn this inquiry over to our readers.—Ed.

TESTING PLATE ADHESION

We would appreciate it very much if you would tell us where we could obtain data on testing the adhesion of the copper-nickel-chromium plating on zinc die casting.

We have tried several methods but have not been able to arrive at a satisfactory minimum requirement for standard. —L. J. B.

A full discussion of plate adhesion on zinc die castings was contained in our "Production Clinic for Finishing Die Castings" in February 1949. A copy has been forwarded. We also refer reader L. J. B. to the report in the American Electroplaters' Society publication, The Monthly Review, 33, 166 (1946) concerning AES Research Project No. 3.

While there are several methods for testing the adhesion of plating on zinc die castings, none of them appears to be satisfactory as a means of specification.—Ed.

HOW TO PAINT MAGNESIUM

We have studied for some time the various articles that have appeared in the Die Castings Magazine, concerning the application of Pressure Diecast Magnesium.

We are now contemplating specifying magnesium castings for a new product, but we are experiencing difficulty in ob-

(Continued on Page 8)

Why not send us your next die casting inquiry for prices and perhaps some suggestions that might save you money.

Irving L. Bamford
Boston, Massachusetts
Commonwealth 1-7844

Albert J. [illegible] Company
Chicago, Illinois
Franklin 7-8097

John D. Goode
Indianapolis, Indiana
Talbot 9141

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Detroit, Michigan
Madison 7424

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Sound engineering, metallurgical knowledge and skilled techniques have achieved and maintained a standard of superior quality.

Super Cast has kept faith, always deserving the mark it bears. Super Cast means die castings for those who want the best.

A sound, time-tested institution and a sound time-tested product have won confidence and widespread endorsement.

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SINCE 1919

THE SUPERIOR DIE CASTING COMPANY

1001 London Road CLEVELAND 10, OHIO

Detroit Chicago Pittsburgh

LETTERS TO THE EDITOR

(Continued from Page 6)

taining adequate information concerning the polishing and finishing processes.

An extract from one of the articles states that after polishing, magnesium castings can obtain adequate protection by a single coat of Saran Clear Lacquer. We are unable to trace the makers of this and would appreciate your assistance. Could you also recommend any technical literature dealing with the subject of lacquering and preparing the surface of magnesium die castings for painting. We would also appreciate information concerning the bonding of magnesium surfaces, as distinct from soldering or welding, and one aspect about which we can find little technical data, is the damping effect of magnesium.

It is realized that the information that you might be able to supply will in all probability concern American made products. It is our intention to produce these articles in Scotland, and we would therefore have to study the availability of similar materials obtainable over here. —P.W.L. (Scotland)

We have checked through our back copies but have been unable to find reference to Saran clear lacquer for direct coating of polished magnesium die castings. We have checked with Dow Chemical Company, manufacturers of Saran polyvinylidene chloride resins, and find that the lacquers based on this material would not be suitable for your purpose.

However, in our "Production Clinic for Finishing Die Castings," July 1947, page 52, it is stated, "Certain investigations have indicated that baked finishes are very effective for the protection of magnesium alloys. Some baking paint systems, for example, using a baked urea-formaldehyde type coating, have shown good adhesion to the bare metal and appear to be particularly adapted to the finishing of large quantities of

(Continued on Page 70)

ZINC DIE CASTINGS for

Beautility

Beauty and utility combined! The critical buying public demands quality of product, simplicity of operation, easy upkeep and outstanding appearance when they choose something with which they have to live or work. Beautility—appearance combined with utility — is therefore stressed increasingly by all manufacturers. And when these are the objectives, zinc alloy die castings invariably solve many design and manufacturing problems.

Industry's preference for zinc as a base for die castings is indicated by the fact that normally three times as much zinc is used for this purpose as all other metals combined. This is due to ease of casting and finishing, excellent physical properties, close dimensional tolerances and wide variety of beautiful finishes which can be attained with zinc base die castings.

New Haven "HALO" Alarm Clock

DIE CASTING is the Process · ZINC, the Metal
***BUNKER HILL*, the Preferred Zinc**

BUNKER HILL 99.99+% ZINC

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6 WAYS BETTER

at no extra cost!

- No copper, nickel contamination
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- Last up to 3 times longer
- A. S. M. E. welded—safer—no leaks
- Better heat transfer
- AMERA-MAG is certified

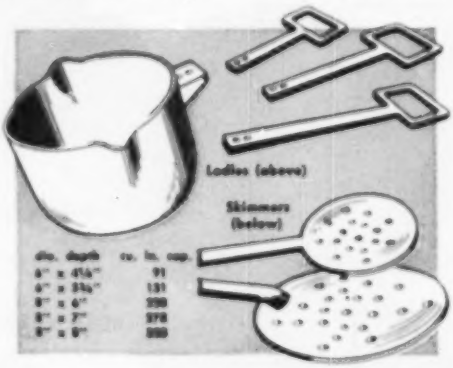
AMERA-MAG crucibles, ladles, skimmers outperform them all

Latest triumph of metallurgy—tough, fine-grained AMERA-MAG steel has qualities that make it best news for magnesium foundrymen in years!

AMERA-MAG Crucibles—Designed for magnesium. No copper, nickel contamination. Formed and welded—lighter, easier handling, yet safer and longer lasting. Resist thermal shock, high-heat and distortion. No cracks or leaks. Retard scaling. Tested, proven vastly superior to cast crucibles, **yet cost no more.**

AMERA-MAG Ladles—Have interchangeable handles. Durable, pressed steel construction—deep drawn to avoid spilling. Spouts designed for proper pouring. Lightweight—less operator fatigue. Spherical bottom reduces metal adherance—easy to clean.

AMERA-MAG Skimmers—Order now for early delivery with your new AMERA-MAG crucibles and ladles. For complete information, write or wire . . .



dia. depth	cu. in. cap.
6" x 4½"	91
6" x 5¼"	131
8" x 6"	250
8" x 7"	278
8" x 9"	350

THE American TANK & FABRICATING CO.

K. J. Humberstone, Chief Metallurgist

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Kalamazoo, Mich.

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To assure you of on-time deliveries of your die castings, Precision has the same standardized equipment and methods in all five modern plants. For example, your dies can be used on the die casting machines in any Precision plant. Thus, in case of emergencies, the production of any plant can be supported or completely supplanted with the end result that you are assured of a constant source of die castings to keep your production lines moving.

This Precision policy also permits production of your die castings at two or more of our plants where high quantities are required and a diverse distribution is desired.

Precision is now in position to provide both national and international facilities through our affiliation with the Wolverhampton Die Casting Company of Wolverhampton, England.

Why not play safe and let Precision keep your production lines going with a continued and uninterrupted supply of superior Precision Die Castings?

Better DIE CASTING in ALUMINUM MAGNESIUM AND ZINC

Call a **PRECISION** Engineer, Today!

**Since 1909 the name "PRECISION" has been the symbol of highest quality in the die casting industry.*

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Syracuse, N. Y. · Cleveland, O. · Kalamazoo, Mich. · Chicago, Ill.

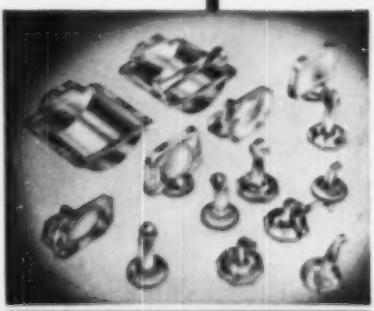
British Affiliation — Wolverhampton Die Casting Co., Wolverhampton, England

FINISHABILITY!

Yes, ZINC DIE CASTINGS CAN TAKE ALL OF THESE FINISHES

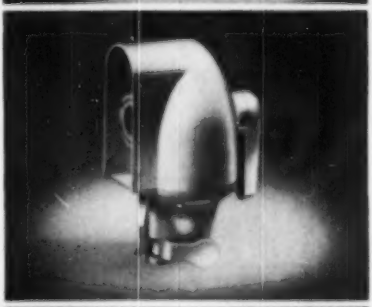
ELECTROPLATING

If it's a beautiful plated finish you are after, the die casting should be ZINC. The ability of ZINC die castings to take all types of electrodeposited coatings *easily* and *economically* is one of the primary reasons why ZINC gets the call over other commonly used die casting metals. The ZINC die cast bathroom hardware at the right is finished with a durable copper-nickel-chromium plate.



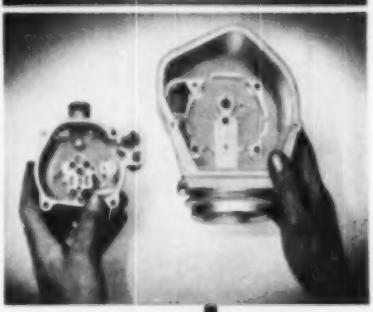
ORGANIC COATINGS

Because of the smooth as-cast surfaces of ZINC die castings, enamels, lacquers or paints are applied with a minimum of surface preparation. Such finishes can be air-dried or baked, depending upon service requirements. See the gleaming white enamel coating on the ZINC die cast washing machine wringer-head pictured at the right.



SPECIAL FINISHES

Special finishes for particular protective or beautifying effects are frequently applied on ZINC die castings. These take the form of chemical treatments, plastic coatings or decalcomanias. The automobile carburetor at the right has been Cronak treated—a corrosion-inhibiting chromate coating process developed and patented by The New Jersey Zinc Company.



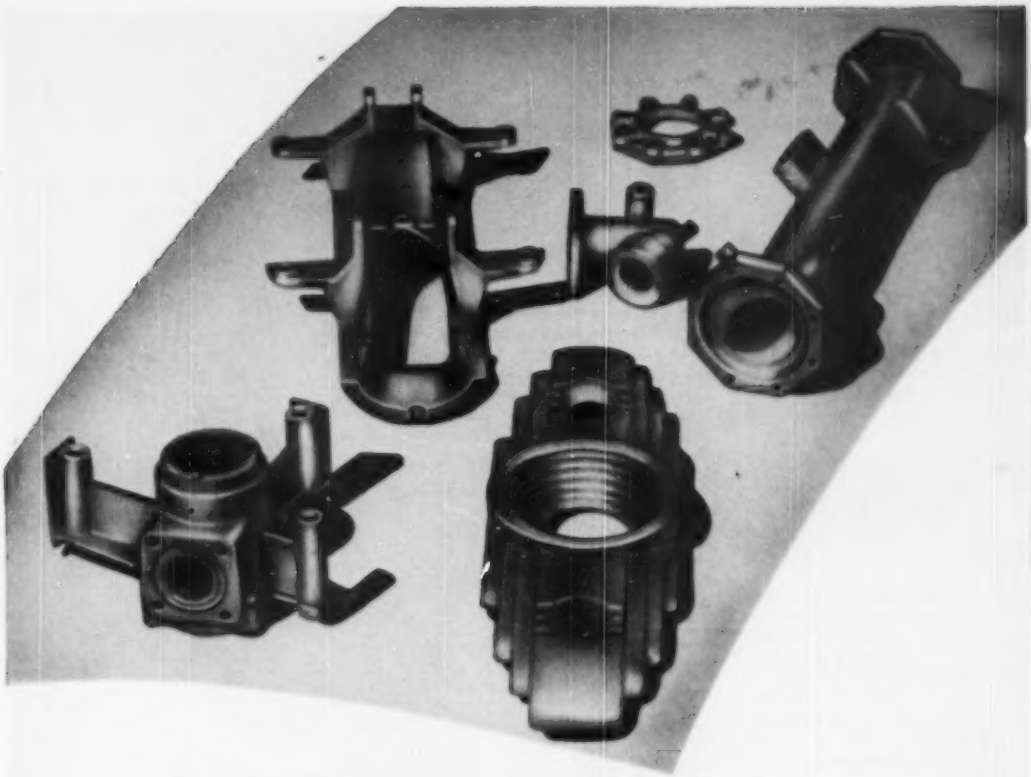
A combination of many advantages—of which finishability is only one—make ZINC die castings the most widely used. Every die casting company is equipped to make ZINC die castings and will be glad to discuss these advantages with you. Or write to us.

The New Jersey Zinc Company, 160 Front Street, New York 7, N. Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC



The Results of a Recent Meeting!

Recently a leading gasoline pump manufacturer came to Parker with an intricate part problem. Our engineers consulted with him and together worked out the correct design and best material alloy for the job. An economical production run was set up at a worthwhile unit saving.

Shown above are the six Parker die cast parts for one assembly.

It pays to consult with Parker early in the development of die cast parts.

Write for our book on Parker facilities. Send us your blueprints.

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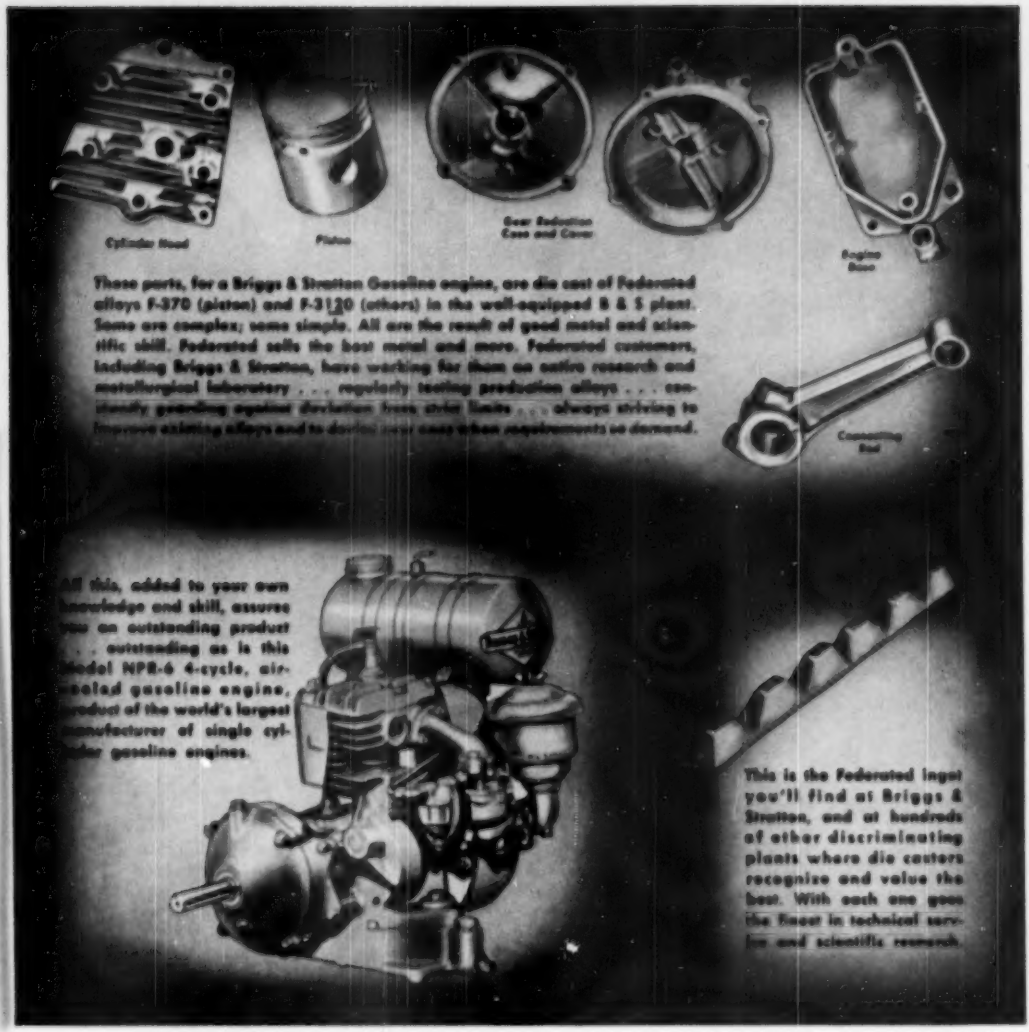
PARKER ALUMINUM *and* ZINC *Die Castings*


Cylinder Head
Piston
Gear Reduction Case and Cover
Engine Base
Connecting Rod
These parts, for a Briggs & Stratton Gasoline engine, are die cast of Federated alloys F-370 (piston) and F-3120 (others) in the well-equipped B & S plant. Some are complex; some simple. All are the result of good metal and scientific skill. Federated sells the best metal and more. Federated customers, including Briggs & Stratton, have working for them an entire research and metallurgical laboratory . . . regularly testing production alloys . . . constantly guarding against deviation from strict limits . . . always striving to improve existing alloys and to develop new ones when requirements so demand.
All this, added to your own knowledge and skill, assures you an outstanding product . . . outstanding as is this model NPB-6 4-cycle, air-cooled gasoline engine, product of the world's largest manufacturer of single cylinder gasoline engines.
This is the Federated ingot you'll find at Briggs & Stratton, and at hundreds of other discriminating plants where die casters recognize and value the best. With each one goes the finest in technical service and scientific research.

Federated Metals in a Briggs & Stratton Story

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For die casting alloys, for help with die casting or with any non-ferrous metal problems, see Federated first.

Federated METALS DIVISION

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Or *Re-styling* an Old One . . .

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As a leading supplier of highest quality zinc alloy die castings, we have a wealth of experience which is available to designers without obligation.

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Aluminum and Zinc Base

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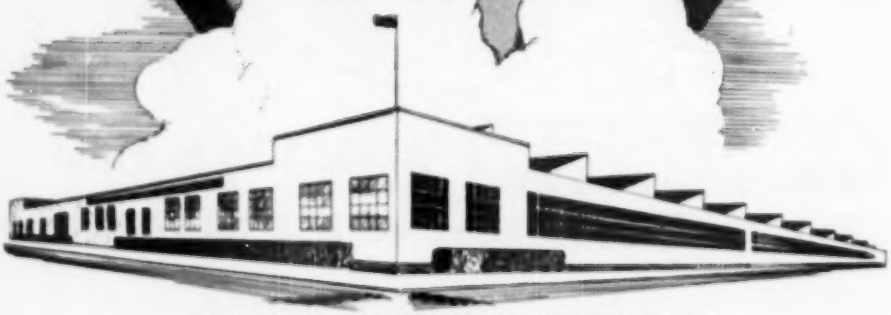

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Gearhead Micromotor assembled.
Die castings, including (left) an extra casting providing for a jackshaft
enter 3000 .... exit 2

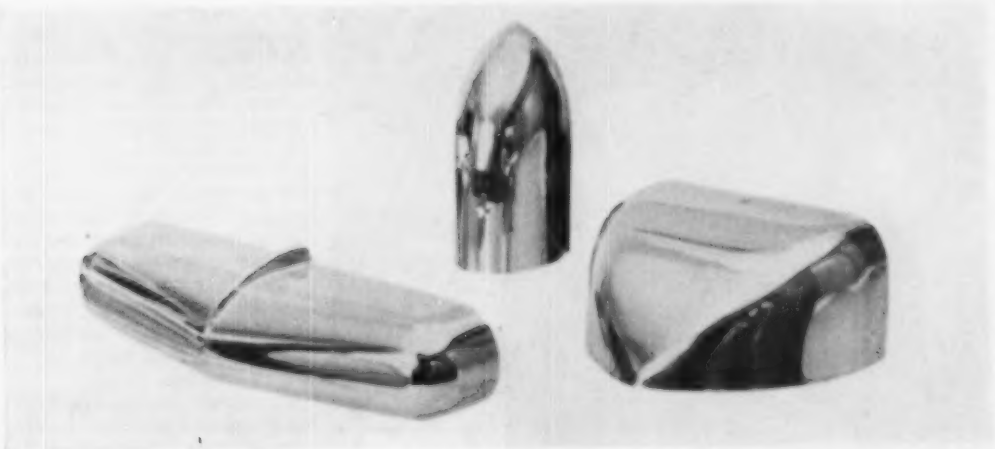
Furnishing power for such slow-moving equipment as vending machines, phonograph turntables and animated window displays—that's the unusual job of the Redmond Gearhead Micromotor made by Redmond Company, Inc., Owosso, Michigan. To do it, a gear reduction assembly cuts down the 3,000 R.P.M. of the Micromotor to as low as 2 R.P.M. at the gearhead output shaft.

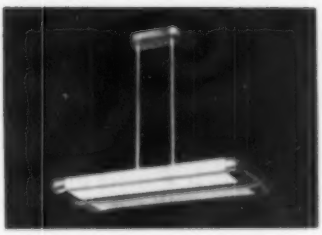
The torque developed in this reduction exerts tremendous stress on the housing—but it's a housing that can take it, for it consists of two zinc die castings specially ordered from The Hoover Company to provide the necessary rigidity and resistance. The castings are good-looking and economical, and simply screw together. A third Hoover casting can be fitted over the front of the assembly to provide for a jackshaft.

Zinc or aluminum die castings can cut costs, improve sales appeal, help many products in many ways. Perhaps you have a problem that can be solved by Hoover's 28 years of experience and its complete engineering, design and production service. If you wish, a Hoover sales engineer will gladly call on you, without obligating you in any way.

THE HOOVER COMPANY
Die Casting Division, North Canton, Ohio

HOOVER
SPECIALISTS IN THE FIELD OF DIE CASTINGS





Special feature of the Lytron overhead lighting fixture is its snap-on attachment of the end pieces. Die casting these in zinc provides a piece which is rigid enough for this purpose, and yet allows a shape which would be difficult to deep draw in sheet stock of comparable gauge.

Bright chrome plating over preliminary coatings of bright copper and nickel give these lighting fixtures a brilliantly reflective surface which will withstand the corrosive effects of atmosphere. The quality of the plate compares with that of the best automotive plating on zinc base die castings.

Light Overhead

THE ability to die cast shapes which would be tough to stamp or draw from sheet stock thick enough to be rigid has been an important consideration in the production of Lytron overhead lighting fixtures by by Lightolier, Inc.

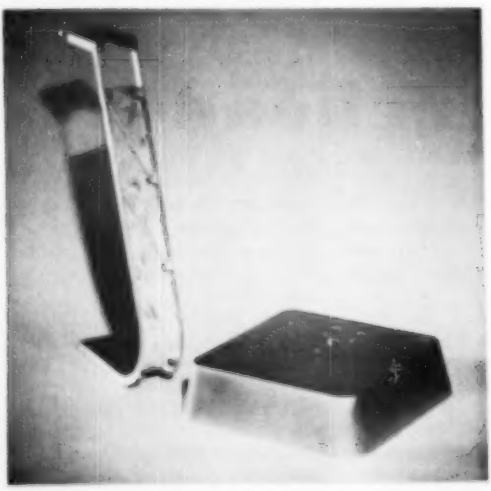
Chromium plated ends that can be snapped on or off without screws or tools are a special feature of the new Lytron fixtures. This depends upon a certain rigidity which would be difficult or impossible to obtain from sheet stock of light enough gauge to be formed into the required shapes.

Of course, one of the most troublesome die castings to produce is likely to be one with large, unbroken areas which are to be chrome plated. The bright chrome has a tendency to bring out any surface blemishes; the problem for the die caster, therefore, is one of producing a "hardware finish" which yields a flawless final plating with a minimum of polishing and buffing.

Yet, Lightolier is obtaining on a production basis, zinc alloy die castings with a brilliant chrome plate of superior quality. A copper-nickel-chrome plate similar to that applied to automotive hardware is used to resist tarnishing or peeling.

Attractive finish is a vital ingredient of the successful sales of desk fixtures, like the Deskmaster unit shown above. Notice the soft lustre of the satin finish, which is available in brass, bronze or black nickel. The brushed surface is well suited for application to zinc die castings. After plating these lamp bases and standards get a protective coating of clear baked lacquer.

Structural design of the lamp arm is revealed by this rear view of the unfinished casting. Diagonal ribbing not only contributes to the strength of the casting, but also improves injection of metal into the die. A stamped plate covers the rear surface.



The use of die cast end pieces has also permitted the use of fillets where needed for extra strength. Nearly uniform wall sections have been specified throughout in order to facilitate the flow of metal.

While it is true that comparable stampings would be less expensive to produce, they would also be less satisfactory because they would present two alternatives: either the shapes and design would have to be changed, or the gauge of metal lightened.

Satin Brass Finish For Desk Fixture

For their Deskmaster lighting fixture, Lightolier is also using a pair of zinc alloy die castings because of the combination form and finish called for by the modern styling.

The sturdy base for stability, and the slender curved arm to support the lamp shade are both produced by the die casting process.

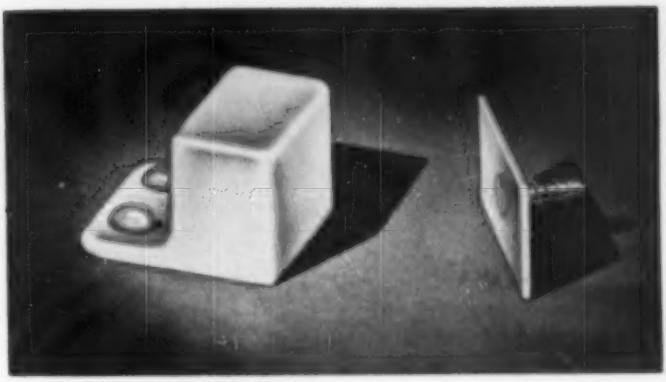
The arm is a structural unit with a channel cross section. The back is substantially ribbed not only for extra rigidity, but also to aid the flow of metal along the narrow, thin-walled piece. A series of pads inside the walls serve to mount a stamped strip which covers the back. Holes are drilled and tapped for mounting.

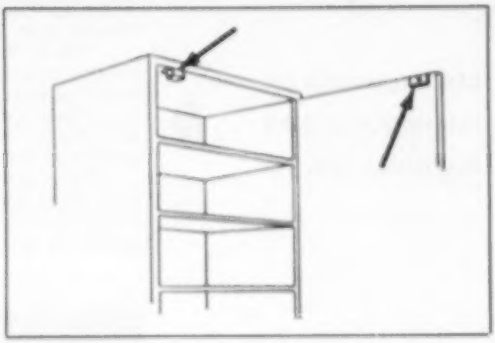
Finish on these two pieces is extremely important, although the type of finish which is applied calls for all-over mechanical treatment so that the as-cast surface is not as critical as in the case of bright chrome plating.

These parts have a satin brushed surface, with plating in brass, bronze or black nickel. These are handsome finishes well-suited to the clean lines of the fixture. A clear lacquer applied over the plating protects and preserves the surface.

Little machining is required on any of these castings. Some tapping and piercing of holes is required, in addition to flash removal. Die partings around the bottom or outer edge simplifies this latter problem so that no flash removal is needed on surfaces to be plated.

Figure 1, above, and Figure 2, below, show a closeup of the unique cupboard door latch and a diagram of the manner in which it is mounted. Alignment of the two components is extremely simple. By casting the magnet as an insert in a zinc die casting, a permanent and readily-finished unit is achieved.





Magnetic Insert For New Type Latch

SURELY no type of gadget is more commonplace and standardized than the ordinary cupboard latch available at every hardware and dime store. These devices have conventionally consisted of a spring-loaded latch which engages in a latch plate.

And yet it is often the most commonplace gadget which yields the most promising results upon being redesigned. The application of new materials, new methods and new principles of operation may result in great improvements. The imaginative engineer is likely to be the one to discover the inherent possibilities of such a change.

As an example of this type of development, one can examine the newest type of catch for cupboard doors, Figure 1. This is the Leco-Latch manufactured by Laboratory Equipment Corp., St. Joseph, Mich.

Principle on which this door fastener operates is that of the attraction of a permanent magnet for a steel plate. Patent has been applied for on this Leco-Latch which consists of two parts: a permanent magnet embedded in a zinc die casting, and a steel plate screwed to the cupboard door, Figure 2.

The die casting has a pair of slots which are used for fastening the piece inside the cupboard, as illustrated. These holes are cored, and permit adjustment of the magnet's position into correct relationship with the steel plate.

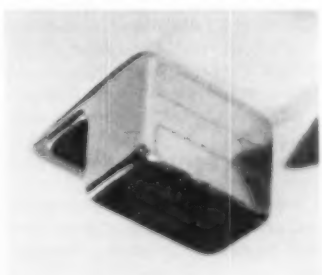
Since there are no moving parts or springs, there is nothing to wear out or break. Doors are held firmly, and yet open easily without a noise or jerk.

Zinc alloy die casting has been chosen to provide a permanent and attractive retainer for the magnet because of its low cost in large quantities and its attractive appearance. Although molded plastics were tried, they were found to be unsatisfactory from several standpoints.

Obviously, grinding off the magnet in the die casting results in a smooth, even surface. The casting is given a nickel plate for brightness and appearance.

The low cost of small, simple die castings produced in large quantities ranging into the millions is the reason why a large number of small hardware parts, electrical fittings and plumbing parts are being die cast in zinc.

Figure 3. Two magnet faces cast as an insert in the zinc die casting can be faintly seen on the photograph, below. The surface is ground perfectly flat. No other machining is needed.



Gears and Impellors

FOR HOUSEHOLD APPLIANCES, LIGHT MACHINES, ETC.

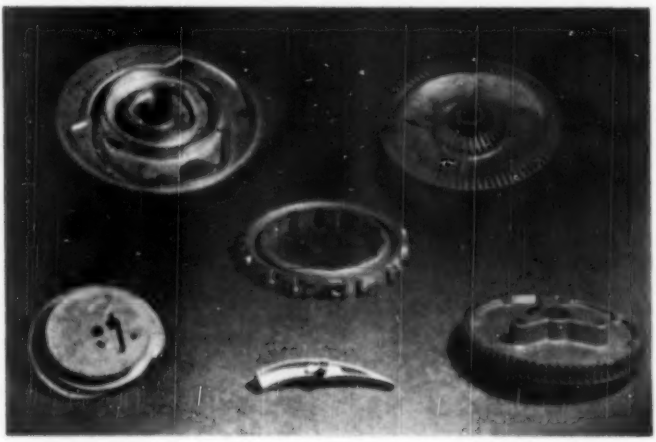
THOUSANDS of gears, wheels and impellors are die cast annually for uses ranging from household appliances to industrial machinery, from voting machines to vending devices.

Where the mechanical properties of the die castable alloys meet the requirements for a specific job, it is likely to be true that manufacturing costs are lower by die casting.

The economy here is brought about by the accurate shaping of gear teeth, impellor blades, numbering wheels, or other special peripheral forms without machining or other operations.

The examples presented here illustrate only a few of the many types being produced currently, but will serve to indicate some of the possibilities for combining gears with cams, for using inserts, for producing specially shaped blades, etc.

CAMS COMBINED WITH GEARS WITHOUT MACHINING.

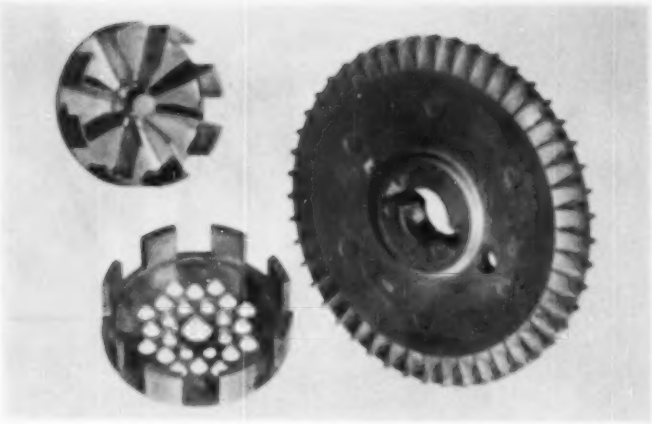


BEVEL, SPUR, WORM, HELICAL, FACE, SHOULDERED AND OTHER FORMS.

NO LIMIT ON GEAR SHAPES: Great freedom in the design of gear teeth is permitted by the use of die castings. Bevel, spur, helical, worm, planetary, face and other types of gears can be produced to accurate forms within close overall tolerance limitations.

Shouldered gears are readily produced. These are, in fact, particularly desirable because the trimming die then needs to be only a simple circular form. For trimming flash from the edge of other gears, a simple facing operation is usually sufficient.

Shown *above* are a few gears, some combined with cams for operating record player turn-tables and one including two bevel gears. Notice also the numbering wheel with each character formed by a separate slide in the die.



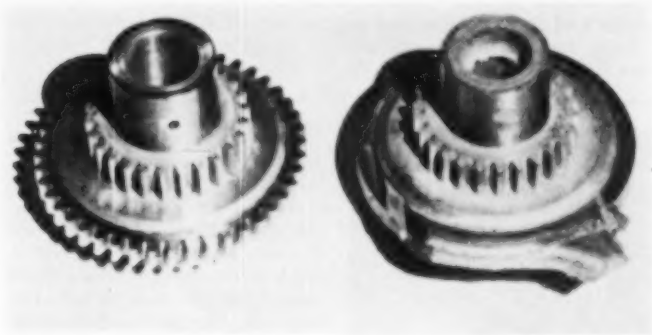
CONCENTRICITY AND BALANCE CAN BE MAINTAINED.

SMOOTH SURFACES ON IMPELLORS: Shown, *above right*, is a heavy duty impellor used in an oil pump. The smooth surfaces and accurate formation of the blades increased the efficiency of this unit over previous sand cast ones. The blades are offset between front and back.

Two castings at *left* are the impellor and housing for a small siren. Close concentricity and balance have been maintained, and the air passages have been well controlled. Two units fit together without machining of ID or OD.

Impellors are currently produced in many alloys, although those shown above are in zinc. In this class are aluminum vacuum cleaner fans, copper sump impellors, zinc cooling fans for electric motors, and aluminum water driven turbines for lawn sprinklers.

EFFICIENCY OF IMPELLORS HIGHER DUE TO SMOOTH SURFACE FINISH.



INSERTS OF OTHER METALS SUPPLEMENT DIE CAST ALLOY PROPERTIES.

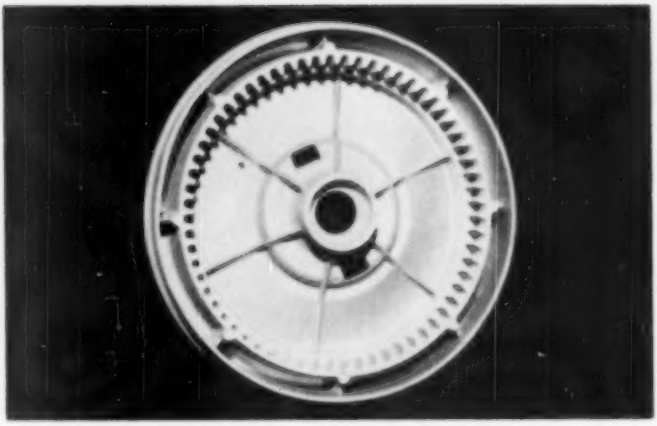
INSERTS SUPPLEMENT DIE CAST PROPERTIES: Three separate inserts are bonded together in the zinc die cast washing machine drive gear, *above*. Two hardened steel inserts serve as clutching surfaces, while a bronze blank is subsequently machined with helical gear teeth.

At the *right* is the raw casting, as received, and at the *left* as machined. Notice the largest diameter gear which is machined from the bronze blank. A steel sleeve can be seen, at the top, while on the underside, out of sight, is an internal friction surface consisting of another steel insert.

By this method, one shouldered gear is obtained free, and the concentricity of two clutching surfaces and two gears is accurately established by the die cast assembly.

DIE CASTING IS A METHOD OF ASSEMBLING PARTS.

ZINC, ALUMINUM, MAGNESIUM, TIN AND COPPER USED.



GEARS IN MANY METALS: The aluminum internal gear shown *above* is part of the wheel of a lawn mower, chosen for lightness, low cost production and strength.

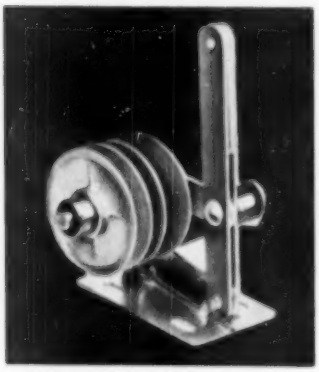
Tin die cast pinions are used by the thousands in voting machines. These tiny pinions are in tin because of the extremely high dimensional stability of the alloy under all temperature changes, guaranteeing accurate operation under subzero or tropical temperatures.

REPLACEMENT COST LOWER THAN COST OF GEAR CUTTING

Die cast copper gears find use where high tensile strength, special corrosion resistance or electrical properties are desired.

However, for the most part zinc alloys are chosen for gears in textile machines, business machines, vending apparatus and domestic appliances because the tooth strength of the alloy is high enough for ordinary duty, die and maintenance costs are low, and bearing properties of the metal are sometimes satisfactory without bushings. Where stresses are too great, zinc gears may be used regardless of this problem because the cost of replacement is insignificant compared with the cost of shaping or hobbing complex gear forms.

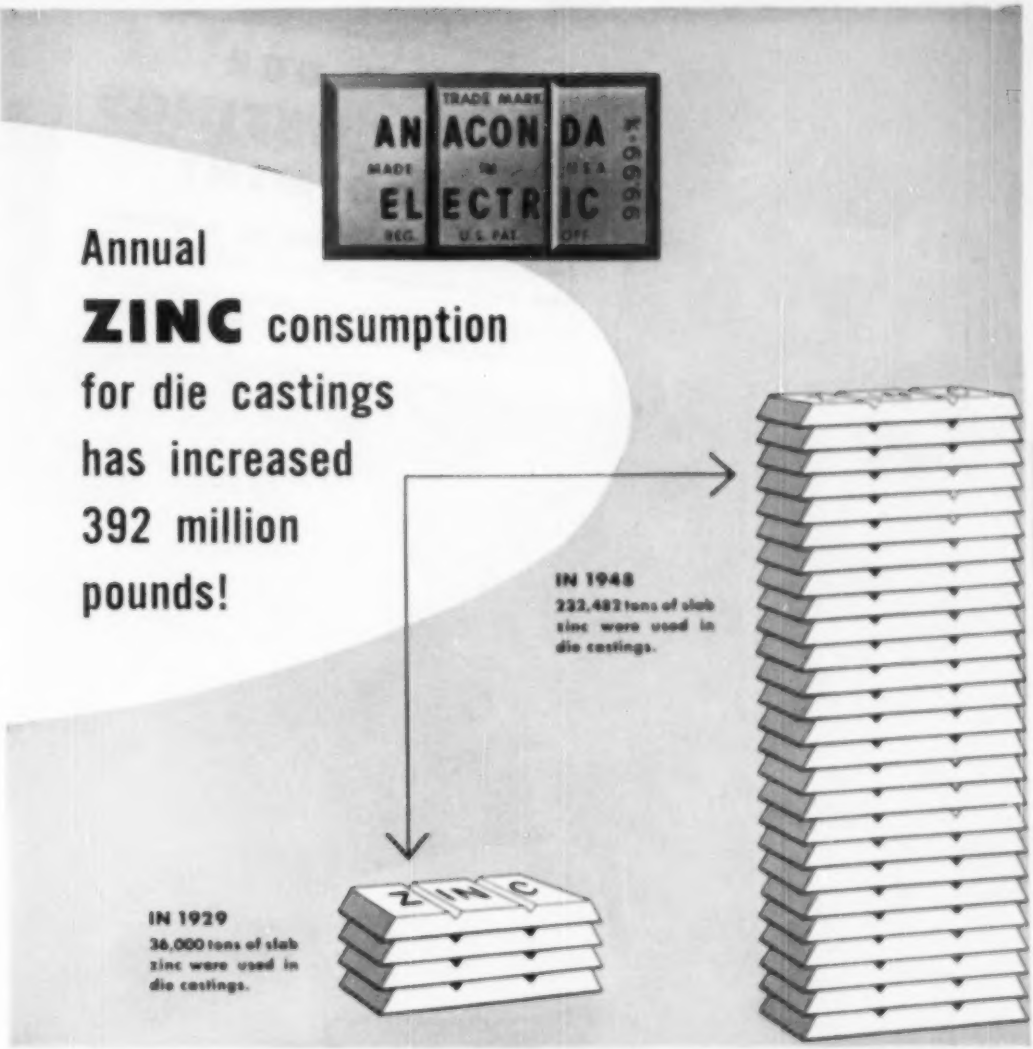
PULLEYS AND OTHER POWER TRANSMISSION ELEMENTS.



A NEWLY designed transmission known as the die cast cub variable speeds transmission has been introduced by the Standard Transmission Equipment Company of Pasadena, California.

This is the newest and smallest of a line which already includes two types and six sizes and differs from previous models in that the pulleys are die cast in zinc and the frame work is constructed of stamped steel. The die cast spindle rotates on a bronze bushing over a stationary steel shaft. This shaft is anchored to the pivotal frame and is drilled for forced lubrication of the rotating member.

Exhaustive tests have been run, and the design has proved to be sturdy and capable of doing good work within the limits of its size. The patented belt alignment feature which is characteristic of the Standard line is also included in this model.



To be precise, the annual consumption of zinc for die casting has increased 392,964,000† pounds since 1929.

This increase is a tribute to the energy of die casters in widening their markets, and to their skill in meeting so successfully the competition of other fabricating methods.

It is a tribute to the alertness of the great number of manufacturers who have recognized and benefited from the advantages die castings afford.

It is also a tribute to the intrinsic value of zinc as a die casting medium. It bears witness to the efforts of zinc producers to meet the requirements of die casting standards for zinc purity.

Anaconda is a dependable source of dependable zinc for die castings. Anaconda does not make die castings, but supplies ANACONDA Electric® Zinc, 99.99+% pure, to the die casting industry. Anaconda Sales Company, 25 Broadway, New York 4, N. Y. Subsidiary of Anaconda Copper Mining Co.

†From "Metal Statistics"
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Latch On to Lower Costs

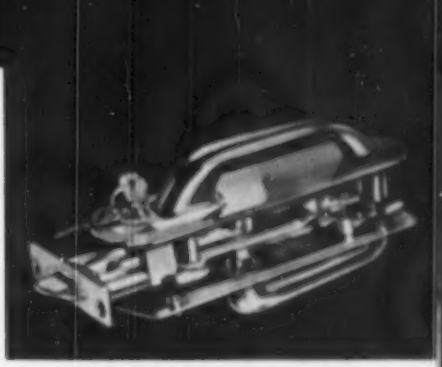


Figure 1. Half-way between automotive and construction hardware, this door latch for a house trailer has to be rugged, attractive and foolproof. Eight parts of it are zinc alloy die castings.

HARDWARE and fittings for house trailers are subjected to a set of service conditions half way between those applied to automotive and builders' hardware. Furthermore, there are certain operating conditions peculiar to the house trailer industry which affect the design of such hardware.

Theodore Bargman, Detroit manufacturer of hardware, electrical fittings and other parts designed specifically for house trailers, makes use of zinc die castings wherever the shape of a part and the quantities in which it is produced make it feasible.

Eight parts of their most popular door hardware, Figure 1, are die cast in zinc. Certain of the standard electrical fittings such as couplings, mounting flanges, etc., are also die cast. For interior trim, such as lighting fixtures, die castings are used only where sufficient quantities of any one model are to be produced, since these parts are not standardized into one or two designs.

The door latching and locking mechanism must be proof against all sorts of physical abuse—vibration, impact, exposure to the weather and abra-

(Continued on Page 60)

Figure 2. Interior and exterior escutcheon not only serve to beautify the styling, but also serve as mounting and sealing units. Notice slight recesses on under surfaces. These are filled with sealing compound to make the unit watertight.

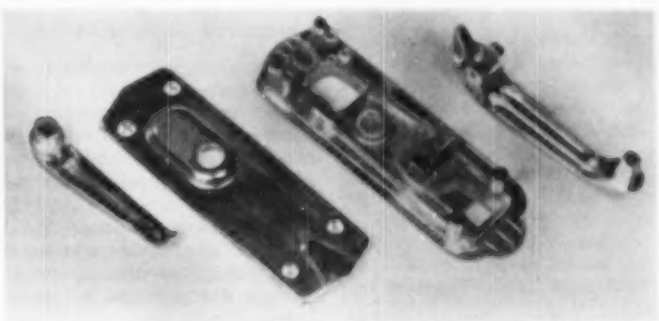
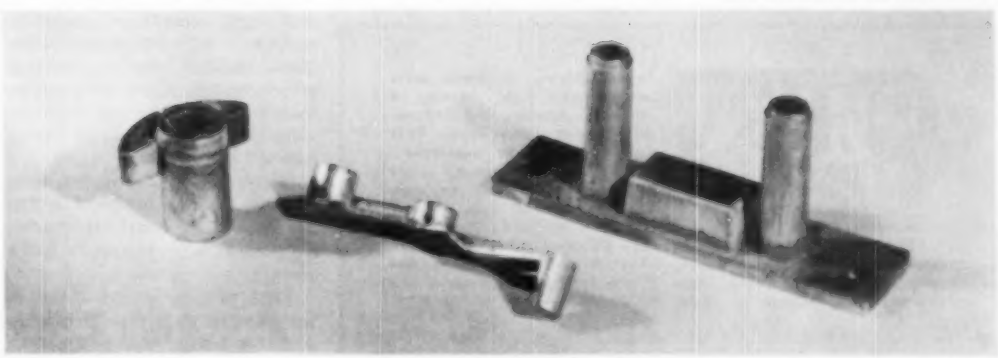


Figure 3. Shapes such as these are more economical by die casting than by any other process. Quantity in which trailer hardware is produced more than justifies tool costs.



Sound-Damping In Business Machines With Magnesium Die Castings

THE special properties of die cast magnesium alloys make them well suited for the outer shell of the Stenotype machine, Figure 1, a portable device for taking shorthand with extreme speed and accuracy.

In addition to lightness, which is the most generally recognized property of magnesium, this machine obtains quietness of operation and high resistance to breakage through other characteristics of magnesium.

Quietness comes partly from the high damping capacity of the alloy; resistance to breakage results from its low modulus of elasticity. The high strength-to-weight ratio of magnesium is particularly desirable for portable machines of this type.

The Stenotype is distributed by LaSalle Extension University, Chicago.

The Stenotype itself resembles a miniature typewriter, printing letters according to a phonetic system on a continuous narrow paper tape which folds into a pull-out tray at the rear. The type travels a very short distance for printing, contributing to the high speed of the unit.

Also an essential factor in the high speed of the machine is the close fit of all parts. Precision assembling and hand fitting, as well as multiple inspections, represent the major portion of manufacturing costs—materials and components ready for assembly represent less than 25 percent.

Speed is only one of several important features of the Stenotype. (Present speed record is 382 words per minute; before this record could be established, a "Fastest Talker" contest was held to find someone capable of reading that fast.)

Quietness is important: Although it operates with metal type striking against a strip of paper, the clatter which is typical of typewriter operation would not be permissible in the court room, conference room or convention hall where the Stenotype is commonly in use.

Magnesium for Sound Damping

The damping qualities of magnesium, the method of mounting the mechanism on rubber and the elimination of noisy vibration, friction and impact wherever possible are responsible.

Lightness is important: Total weight of the Stenotype is about three pounds, of which the magnesium die castings represent only a few ounces.

Lightness, by itself, is not sufficient, however. It must be combined with resistance to impact. Molded plastics, for example, would satisfy the requirements of weight, but lack the requisite strength; die cast magnesium has both.

Dependability is important: Failure of the equipment during an important court or conference session could not be tolerated.

Part of the dependability of the Stenotype is due to the use of die castings for the two hous-

STENOTYPY — or "machine shorthand" as it is often called—records words by sound only, using phonetic arrangements of plain English letters. Stenotype notes never become "cold" because all notes are standard and uniform, regardless of rate of speed. They can be read by any Stenotypist.

Keys can be depressed singly or simultaneously, and the average speed for all types of work is a word a stroke. There is no limit to speed except the speed at which the operator moves her fingers. The present record is 382 words per minute.

ing parts, the ribbon mounting plate and the trunnion and ball crank. The service department reports that there has never been a case of servicing due to failure or necessary replacement of a die cast component.

In the early stages of manufacturing, the design of the housing presented some special problems for the die caster. In the first place, the juxtaposition of thick and thin sections interfered with the smooth flow of molten metal into the die, resulting in an unsatisfactory surface for finishing. Shrinks, swirls and cracks were difficult to overcome.

Change In Section Improves Castability

Later consultation with the die caster resulted in the development of a more uniform section thickness, smoother blending from one thickness to another, and redesign of the bosses to allow proper ejection. This not only has resulted in better surface finish and sounder castings, but has stepped up the rate of production and reduced the amount of scrap loss.

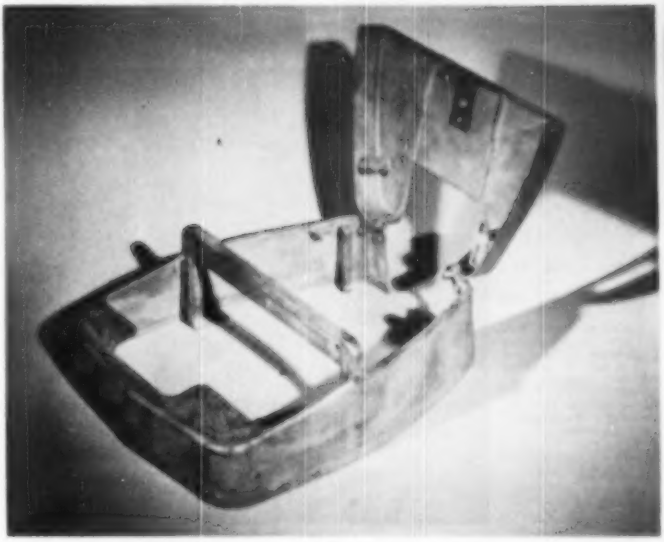
Surface finish is a critical problem on this type of equipment. The as-cast surface of the magnesium die castings can be finished without polishing or buffing. They are first treated with a chrome pickle and then sprayed with a hammered type baked enamel. The cover casting is finished in two tones, achieved by the use of a spray mask.

The words, "LaSalle Stenotype," appearing on the front of the machine, are silk screen printed, achieving a sharp, clean letter at low cost.

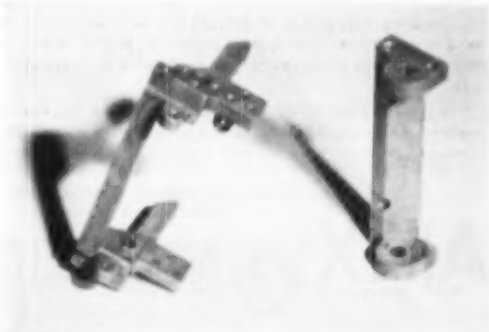
The principal function of the two housing die castings is to protect and shield the mechanism. They are not intended as mounting frames, since the entire mechanism is assembled separately and then mounted beneath the main casting.

The cross brace at the center of the large die casting, Figure 2, provides greater strength for reinforcement against pressure in the shipping container. The

Two-tone baked enamel finish over smooth-surfaced die castings sets off the styling of the Stenotype. Redesign of the die castings to obtain nearly uniform wall section has resulted in smooth surfaces on the casting, thereby simplifying the finishing. Notice trade name imprinted on front of frame by silk screen process.

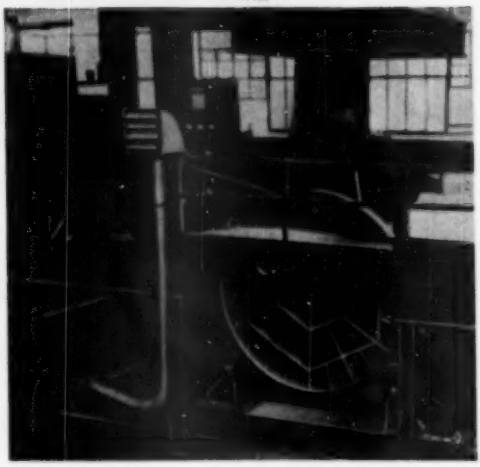


Cross bar on main casting, above, provides valuable reinforcement for rigidity during shipping and operation. Two castings can be hinged together with simple wire hinge, requiring only a facing of the underside of the cover casting for a perfect fit.



Several small, but intricate die cast parts go into the working mechanism. These two parts are critically dimensioned because friction, noise and errors might result from inaccuracy.

Scovill installs WORLD'S LARGEST AJAX - SCOMET Electric Induction Furnace



One of the three 1000 K.W. Ajax - Scomet Electric Induction Furnaces, for melting brass, recently installed at Waterbury, Connecticut, for the Scovill Manufacturing Company.

For faster melting, lower melting losses, close temperature control, and complete dependability in quality results, Scovill Manufacturing Company chose the 1000 KW. Ajax-Scomet Electric Induction Furnace for its new plant. It is the largest and most powerful electric melting furnace ever made for brass.

Holding capacity is 20,000 pounds, with an hourly melting rate of 5½ to 6 tons. Under controlled conditions, molten metal is supplied to continuous casting machines for the production of brass strip of unprecedented size.

Ajax engineers bring you over thirty years' experience in the induction melting field. Ajax-Scomet Electric Induction Furnaces offer distinct advantages in cost reduction and manufacturing efficiency.

AJAX ENGINEERING CORPORATION
Trenton 7, New Jersey

AJAX FARA-WYATT INDUCTION MELTING FURNACE

remainder of the housing sections are uniformly thin, and yet have sufficient resiliency to resist breaking, even when dropped on the floor.

A bar is cast across the back of the main housing to control the width of the opening until the mechanism is bolted into place. It is then sawed out.

Two of the remaining die cast parts, Figure 3, are typical of the complex shapes with multiple angles, holes and curves which can so readily be die cast. Dimensions are critical on these parts.

These small castings have an important part to play in the positioning of the moving parts of the mechanism, so that the location of center distances of holes, and the distances between mounting surfaces are critical. The dimensional stability of the alloys in which these parts are die cast assures permanence of the dimensions. Growth or warping of these parts would result in binding or wedging of the delicately fitted mechanism.

It is no exaggeration to point out that the use of magnesium die castings for certain components of the LaSalle Stenotype machine has increased the serviceability of the unit, enhanced its appearance and increased its durability.

Now that methods for machining and finishing magnesium on a production line basis have been developed and standardized, this material is being introduced into a wide variety of products where its special properties are desired.

DU PONT GRANTS AID TO UNIVERSITY RESEARCH

The Du Pont Company has announced that it has authorized, for the second year, $100,000 for grants-in-aid to universities to "stock-pile" knowledge through the advancement of fundamental science.

These grants-in-aid are for unrestricted use in the field of fundamental chemical research. This plan of assistance was inaugurated last year by Du Pont

on a trial basis with the aim of increasing the amount of such research being done in this country.

LONG LIFE REPORTED FOR HARDENED STEEL PLUNGER RINGS

Field service reports indicating exceptionally long service life for hardened steel plunger rings installed on die casting machines have been received from Orrin P. Sawyer, vice president in charge of production, The Auto-Diesel Piston Ring Co., Cleveland, Ohio.

A number of case histories reported by Mr. Sawyer indicate a reduction in ring-failure and shut-down time. These hardened steel rings are manufactured by the 30-year-old Auto-Diesel Piston Ring Company, which also makes rings, gaskets and other circular parts for marine, aircraft, locomotive, hydraulic, compressed air, steam and refrigerator machinery.

One case history described in the report tells of a die casting concern using hardened steel plunger rings for four months without a shut-down due to ring failure. Wear on the ring at the end of this time was .0015 per month.

Breakdown of the .006 total ring wear in the four month period is of interest. The operation averaged 63 shots per hour, projected over three 8-hour daily shifts for 24 working days per month, a total of 145,152 plunger shots.

Another case history reported by Mr. Sawyer shows 122 days of continuous operation with negligible wear. These rings were immersed in molten zinc more than 800 hours.

Cast Into Shank of Die Cast Filter-Base
. . . *Stabilizes "PRESS FIT"*

The shank of this die cast oil filter-base is accurately machined to assure a snug "press fit" in the round opening of a motor block. Because of expansion and contraction of the motor block . . . caused by heating and cooling . . . some means had to be found to stabilize the size of the shank in order to retain the "press fit" under all conditions.

This was accomplished by casting a steel sleeve into the walls of the shank, as indicated by the arrows in the illustration. Note that the sleeve is imbedded in the shank so that it is covered by the zinc alloy on both the interior and exterior surfaces.

MILWAUKEE Engineers were called upon to solve the rather difficult problem of casting the steel sleeve into the cylindrical wall of the shank, accurately.

Another feature of this die casting is the cast-in "bottle thread" in the circular filter-base which permits the filter unit to be screwed into position. In fact, this casting is delivered to the customer ready-for-assembly without further machining of any kind.

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The life of these Amseco tire inflators and gauges is demonstrated by the large numbers which have been in service fifteen years or longer. Die cast aluminum body, specially designed with a "bumper" around the front end and sturdy valve housing, holds up under the severest treatment. Finish is scratch brushed. Cost of the die cast body is about fifty percent that of the previous sand cast unit, due mainly to deep, accurate holes and intricate machining which were difficult in the sand cast body.

Tire Gauge Calls for Section Variation

ANYONE who has ever seen a garage mechanic slide his tire inflator and gauge across the concrete floor underneath a car, rather than to carry it around, will appreciate the amount of impact and abrasion which it must withstand. Frequently, also, inflators are suspended next to a brick or concrete wall, resulting in abrasion.

To build a tire inflator and gauge which will stand up under this type of punishment, Amseco, Inc., of Chicago, has been using aluminum alloy die castings for the body; many of these units have been in service more than 15 years without failure.

Of course, there are other significant considerations which have bearing upon the choice of materials. Porosity is a problem, as is lightness. And since a great deal of the mechanism is mounted within deep, narrow internal cavities, it is essential to obtain these openings with maximum accuracy without a great deal of machining.

So far as weight is concerned, aluminum die castings have been entirely satisfactory. The Model 1000 weighs just one pound, complete with gauge, valve and fittings.

And despite sharp variations in section thickness which make the gauge body difficult to produce, Amseco has been obtaining from its vendor die castings which are substantially free of porosity in the critical sections. Very small percentage of rejects is reported due to porosity.

The problem here is a sudden change in section thickness between the valve end and the gauge end, as reference to the drawing will reveal. The portion where freedom from porosity is most important is around the valve to prevent seepage of air through into the gauge, resulting in incorrect pressure readings.

The use of large fillets and ample radii, plus skill in laying out the overflow vents around

this section, has resulted in the production of sound castings.

The gauges are normally subjected to line pressures ranging from 145 to 185 psi, although in some industrial applications, higher pressures may be used. These inflator gauges are standard equipment with certain of the major lubricant manufacturers for installation in their service stations. The equipment is therefore subject to the strict specifications and testing of the engineering labs of each company.

Pistol Grip Gives Coring Problem

The unit has been designed with a pistol grip at an angle which is comfortable for holding. Reference to the drawing will disclose that this has necessitated inlet and valve openings at an angle, rather than being parallel and perpendicular to the main motion of the die.

This special accommodation has resulted in a more expensive job of die construction to include movable cores which must be pulled at an unusual angle. It is a case where the advantage of a comfortable grip has been a more significant factor than the added tool costs.

The amount of machining is relatively small, especially as compared with producing a similar part by any other fabricating method.

After snagging the castings, the gauge hole is broached in the top of the casting, and a slot is cut for the cross wire indicator. The hole is fly cut for a lock ring to hold in the glass, and several holes are tapped.

Finishing, too, is extremely simple, since aluminum has a bright, non-corroding surface which protects itself by the formation of a thin, hard layer of oxide. All rough edges are filed and the entire body is scratch brushed. This is a good, serviceable type of treatment which looks well in service.

Protection for Gauge End

It will be seen that two rings are formed in the gauge body around the outer end. These serve to reinforce and shield the unit, acting as bumpers to receive the abrasion and bumps. Any wear on the body of the unit is likely to occur at the front edge, and these ribs help to receive such wear.

The whole unit has been built for long, uninterrupted service, and it is possible to replace the entire gauge as a unit simply by removing the end plate, taking out the complete "package," and replacing it with a new gauge unit. This saves time lost in returning a unit for servicing.

It can be seen that in order to accomplish this, it has been necessary to make components interchangeable from one unit to another. Die castings, with their uniformity, have helped establish this feature.

For example, the springs in the gauges are all precalibrated. Therefore, the depth of the hole in the die casting must conform closely to the requirements of the gauge in order that all gauges give a uniformly accurate reading.

A thin-walled brass sleeve 2-25/32 inches long is cast as an insert at the inner end of the cored gauge hole. This insert is held on the inner end of an unsupported core, and yet is accurately located both as to depth and parallel position. The core which holds the insert is tapered lightly back to the gauge opening, and has no taper along the length which holds the insert.

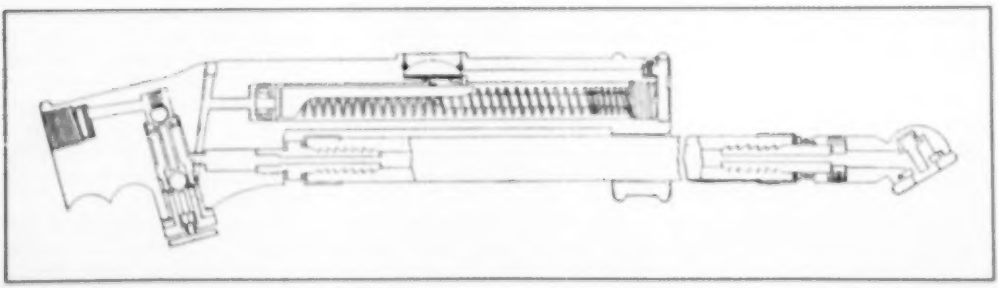
Fifty Percent Less Expensive

Although this inflator and gauge was originally designed for the die casting process, early production models were sand cast during the period the tools were being built. Cost of the completed die casting is approximately fifty percent the cost of the finished sand casting, due mainly to differences in machining and finishing operations.

For a period during the war, zinc alloy was used for the gauge body. The same die was used, with certain changes in the gates and vents. However, for a light weight, thick-sectioned unit, Amseco has since returned to its original use of aluminum.

The small end plate which is placed over the forward end to hold the gauge, is also a die casting, produced from the same die as the body.

Notice the difference in section thickness between the valve end and gauge end of this tire gauge. Greatest care has been required to prevent porosity from interfering with function of the unit. All castings are pressure tested, but very low percentage of rejects is reported.



ALUMINUM TREND UPWARD, ALCOA HEAD REPORTS

The economic readjustments which affected practically all business and industry in 1949 were felt throughout the aluminum industry as well, according to a statement by I. W. Wilson, senior vice president of the Aluminum Company of America. Demand for aluminum and its products was at a high level throughout the first quarter of of the year, but paralleled the general industrial pattern into a midsummer decline. This was followed by an encouraging uptrend beginning in the early fall months.

Labor problems then began to complicate the aluminum picture. Alcoa's aluminum shipments in the final quarter of 1949 were dealt a serious blow by the prolonged strike of the United Steelworkers, CIO, against nine plants of the company. This strike shut down approximately half of Alcoa's aluminum smelting capacity and several important fabricating units for nearly two months.

Despite the factors which tended to limit aluminum production in 1949, preliminary esmates indicate that the probable production of primary (new) aluminum by the whole U. S. industry will be slightly in excess of 1,200,000,000 pounds for the full year, as compared to approximately 1,247,000,000 pounds in 1948.

It is an interesting fact that the industry produced more primary aluminum in the month of May, 1949, than in any month since mid-war August, 1944.

HEADS APPLIED MECHANICS AT ARMOUR FOUNDATION

Ralph W. Fox, 37, has been named assistant chairman of the applied mechanics department of Armour Research Foundation of Illinois Institute of Technology, it has been announced by Dr. Le Van Griffis, chairman of the department.

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Vending Machines Show Versatility Of Zinc Die Casting

Figure 1. Typical of modern vending machines, this Coca-Cola vendor uses many zinc die castings.

ALMOST any commodity used in large volume that can be packaged or stored in a reasonable space can be sold by means of vending machines. Candy, both hot and cold beverages, nylon stockings, cigarettes, crackers and so on, are all dispensed by vending machines. There are types which make proper change when a quarter or half dollar is inserted. In fact, the only limitation on what can be sold seems to be governed by the ingenuity of the machine designers.

The industry is a large one. About $1,000,000,000 of merchandise was sold in 1948 through vending machines and it has been predicted that by 1952, this will increase to over $5,000,000,000. It is estimated that machines are now in place in more than 2 million establishments.

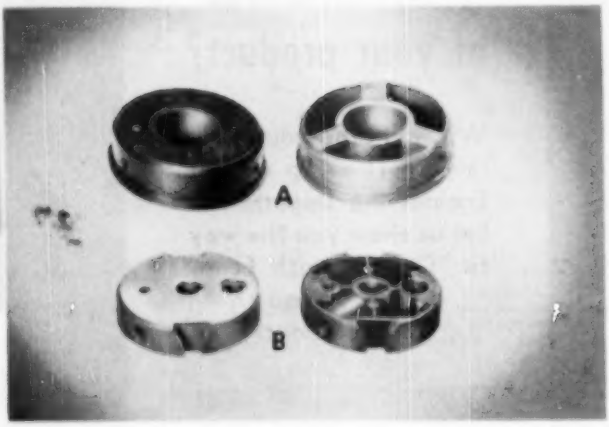
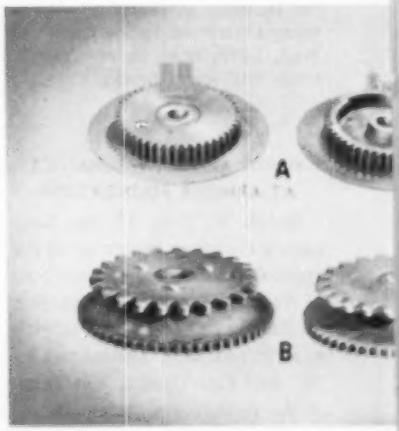


Figure 2. (A) The die cast "basket" bearing, right above, represents a more economical and accurate part than its plastic counterpart shown on the *left*.

Figure 2. (B) When machined from bar stock, left above, this "rear coupling" was difficult to produce. Not only did the zinc die casting, right, reduce weight by more than fifty per cent, but a more desirable and economical part resulted.

Figure 3. (A) By casting the coin block and pinion gear in one piece, right, an assembly of three machined parts and a stamping was eliminated.

Figure 3. (B) By casting the hub as an insert, right, all machining and the previously required brazing are eliminated in the production of the die cast intermediate gear.



The versatility of zinc alloys for die casting is well demonstrated in the manufacture of vending machines where zinc die castings are used for a wide variety of parts — some stressed, some highly finished and plated, some quite complicated, some with very thin sections or heavy ribbing and bosses.

Few industries require the range of properties in materials and parts as does the vending machine industry. In order to give trouble free service day after day, parts must be durable. Unattended, as are the majority of vendors, there must be a minimum of breakdowns and the machine must be foolproof. The public is notoriously hard on any type of equipment and if a way of "beating the machine" is possible, it will soon be discovered.

In addition to these requirements, the vending unit should have a pleasing appearance, otherwise the better class of theaters, hotels and stores will not allow them space.

Zinc die castings are unique in their ability to help solve the above problems. They have good physical properties, lend themselves to high production runs, can be formed readily in very thin sections—.015 to .05 depending on the overall size of the part—or quite large castings —35 lbs. or more. They also can be easily and economically finished by any of the common practices, are readily available and are economical to produce.

Since there are a large number of companies manufacturing vending machines — the majority of which use zinc die castings in one form or another—it is impossible to discuss them all. However, a consideration of some of the typical uses will demonstrate the versatility of the alloy and some of the reasons for its use.

The Vendo Company in the Coca-Cola dispenser which they manufacture shown in figure 1 have four good examples of how, by using zinc die castings in place of other materials, a lower cost, more accurate product was made. Figure 2A shows two "basket" bearings, the right hand one of which is die cast and the other machined plastic. Originally, the part was plastic and the change was made to a

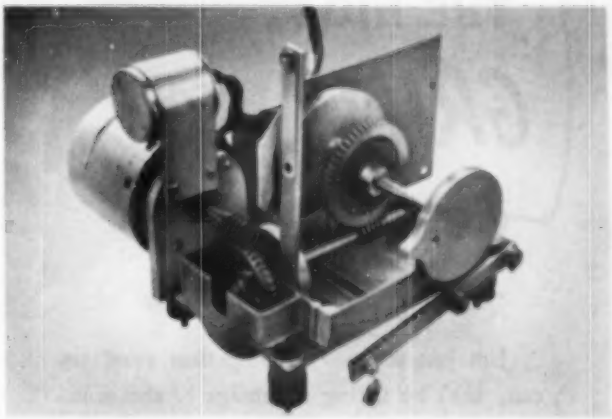


Figure 5. Odd shaped cams, such as those shown above, frequently lend themselves to die casting.

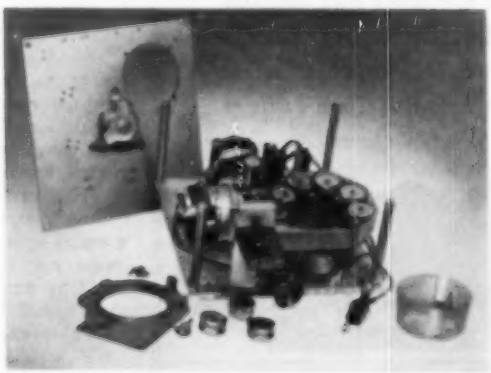


Figure 4. The housing, cover, housing assembly, gear reduction assembly and dispensing gears are all zinc die castings.

zinc die casting to obtain more uniformity in the parts and to reduce cost. Close tolerances are a prime factor in these parts and by using die castings, rejects were substantially lowered.

Figure 2B shows a "rear coupling" which was formerly machined from solid bar stock. The operation was difficult and there was a large amount of machine scrap. However, the part was well adapted to die casting and by good redesign it was possible to decrease the weight of the part by approximately 50 percent. With the saving in material, greater dimensional accuracy and a design which is readily die cast, a much more desirable, economical and trouble free part resulted.

Prior to converting the "coin block and pinion gear" shown in figure 3A to a zinc die casting, it was composed of three machined parts and a sheet metal stamping. The heavy slotted part was brazed in place, frequently causing distortion which created difficulty in the finished machine's operation. The die casting is so designed that all four parts are incorporated in the one piece, simplifying stocking and assembly and yielding a more accurate part.

Originally the large "intermediate gear" shown in figure 3B, consisted of three pieces. The hub was machined from bar stock and because of the required tapered ends, represented a considerable waste of material. As a zinc die casting, this hub is cast as an insert, thereby eliminating all machining and the previously required brazing operation. The part is now more consistent dimensionally and the hole provides a better bearing for the shaft.

Rudd-Melikian, Inc., manufacturers of the Kwik-Kafe automatic hot coffee dispenser incorporate zinc die castings for much the same reasons. Figure 4 is a view of the components of the cup dispensing mechanism of the machine. Some of the most interesting parts in the assembly are the seven zinc die cast magazine cup dispensing gears—five of which are shown in place in the illustration. As can be seen, the part consists of a small spur gear and a large worm cast as a single part. Made by any other means, this part would have required considerable machining and would

(Continued on Page 61)

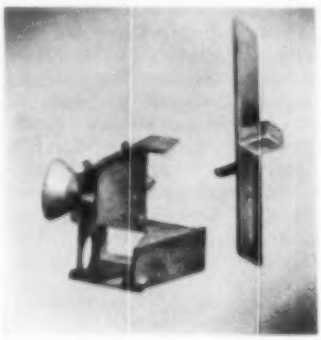


Figure 6. Complicated parts, such as the die cast coin receiver, above, would be impractical by any other means of fabrication.

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FINISHING DIE CASTINGS

A SECTION DEVOTED TO THE FINISHING PROCESSES

MACHINING—Most die castings require some machining operations. In this section will be found information to aid in planning and selecting the proper method and equipment for these operations.

ASSEMBLING—Die castings are generally assembled components. This section includes information on fastenings and methods for mass production assembly operations.

SURFACE FINISHING—Most die castings receive some type of surface finish such as plating, organic coating, anodic coating or chemical coating. This section contains information on the methods, processes and equipment used for the various surface finishing treatments on the die casting alloys.

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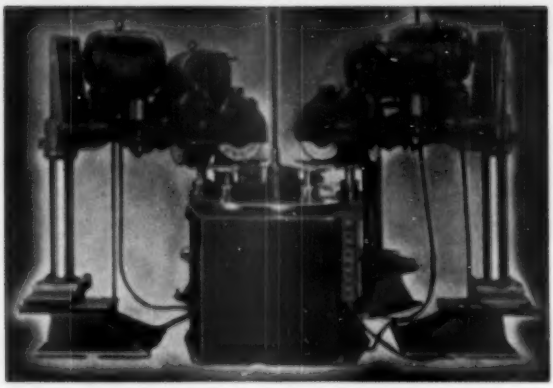
ACME *Indexing Type* ROTARY AUTOMATIC



40-inch ACME Indexing Type Rotary

This photo shows a 40-inch ACME Rotary of the indexing type. It has individual variable speed drive for table indexing with a normal range of up to 1200 indexes per hour. It is equipped with individual drive for work spindle speed and is shown with four ACME Adjustable Floating head polishing and buffing lathes.

ACME Indexing Type Rotaries are available in a wide range of sizes

ACME Indexing Type Rotaries are built in standard table sizes from 18-inch diameter to accommodate 2 buffing heads, up to 10-ft. tables to handle a maximum of 11 buffing heads. These machines are equipped with ACME Adjustable Floating Head Lathes or with ACME Adjustable Polishing Belt Head Lathes with spring or air belt tension and floating back-up wheel and oscillating belts for longer belt life.

Universal, vacuum, magnetic or special holding fixtures; gear type chucks or standard oscillating arms for out-of-round work can also be furnished. Air lift heads synchronized with table indexing making it possible to finish parts with concave surfaces can be supplied.

Polishing and Buffing Machines

ONE SECOND INDEXING TIME BETWEEN STATIONS

A Feature of all ACME Indexing Type Rotaries

One second indexing time is a standard feature of all ACME Indexing Type Rotaries. Output can be standardized at high levels with uniform finish. Dwell time of wheel on work can be controlled as required while the indexing time between stations is held to the one-second interval.

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Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 30 YEARS

A monthly digest of current technical progress selected and prepared by the editorial staff of DIE CASTINGS. *This section is devoted to finishing processes for all types of die castings, and is written specifically for the benefit of the production man.*

DEPOSITION OF METALS ON ALUMINUM BY IMMERSION

A new process for depositing zinc, cadmium and tin on aluminum by chemical displacement was reported by Samuel Heiman, Philadelphia Rust-Proof Company, in a paper before the 98th meeting of the Electrochemical Society. Details of the method which was worked out at the University of Pennsylvania and presented before the Electrodeposition Symposium of the meeting cited the use of solutions containing the metal sulfate and either hydrofluoric acid or the fluoride anion.

The deposited metals were described as having good appearance, sound structure, and excellent adhesion to the aluminum, which does not depend on any roughening of the aluminum surface.

The preferred composition and conditions for depositing zinc on aluminum by immersion were given as follows:

Zinc sulfate ($ZnSO_4.7H_2O$) ..... 5.0N (718.5 g./L.)
Hydrofluoric acid (HF) ..... 1.0N (35 mL./L. 48% acid)
Temperature ..... 25C.
Time of dip ..... 30-60 sec.

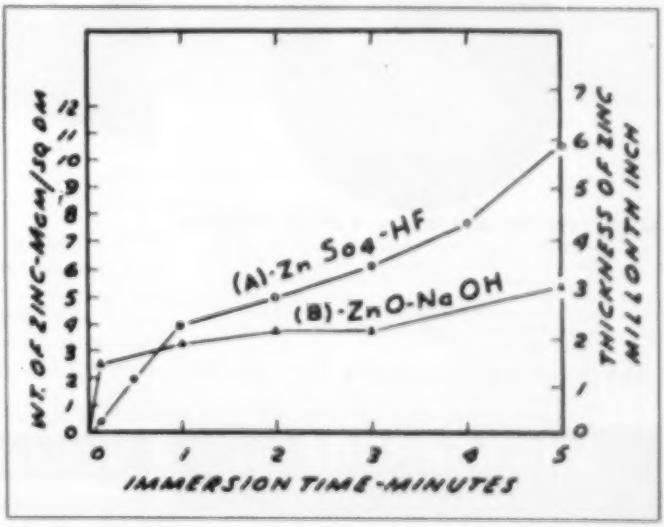
It was reported that the bond between the zinc immersion deposit and the aluminum was greater than the cohesive strength of the aluminum base metal. Heiman stated that the zinc immersion deposit was satisfactory as a basis for subsequent electrodeposition of other plated metals, and experiments have indicated that the method is equal in quality and simplicity to the zincate pretreatment process which is generally considered to be the best commercial method now in use for plating upon aluminum. Shown in Figure 1 is a comparison of thicknesses of zinc deposits obtained by the two immersion processes.

The following step-wise procedure was given by Heiman for use in plating upon aluminum using the newly developed acid fluoride zinc dip:

STEP I Cleaner
Inhibited alkaline cleaner ..... 4lb./L.
Time ..... 3-5 min.
Temperature ..... 60-150C.

STEP II Cold water rinse
STEP III Acid Dip
Hydrofluoric acid solution ..... 0.5 N
Time ..... 2-3 Min.
Temperature ..... 25 C.
STEP IV Cold water rinse
STEP V Film removal bath
Nitric acid (sp.gr. 1.42) solution ..... 70%, by vol.
Time ..... 10-20 sec.
Temperature ..... 25 C.
STEP VI Cold water rinse
STEP VII Acid fluoride immersion zinc dip
Use solution and conditions as given above.
STEP VIII Cold water rinse
STEP IX Copper strike
Copper cyanide ..... 20.0 g. /L.
Sodium cyanide ..... 23.0 g. /L.
Sodium carbonate ..... 30.0 g. /L.
"Free" sodium cyanide ..... 6.3 g. /L.
Temperature ..... 25 C.
pH of bath 10.0
Current density of operation ..... 20-30 amp./sq. ft. for 10 sec., then 5 amp./sq. ft. for 1 min.
STEP X Cold water rinse
STEP XI Copper plate
Commercial copper pyrophosphate type of solution
Current density used, 30 amp. sq. ft.
Time of plating ..... 15 min.
Thickness of copper plated 0.0005
STEP XII Cold water rinse
STEP XIII Nickel plate
(This metal was plated for adhesion tests; other metals may be plated over the copper coating)
Nickel sulfate ..... 240 g./L.
Nickel chloride ..... 45 g./L.
Boric acid ..... 30 g./L.
Sodium lauryl sulfate ..... 2 g./L.
Temperature ..... 55 C.
pH of bath 5.2
Current density ..... 10 amp./sq. ft.
Time of plating ..... 20 min.
Thickness of nickel plated 0.0002
STEP XIV Qualitative adhesion tests
1. Panel bent in half through 180°; peeling or flaking observed especially at the bend.
2. Heating tests:
Oven test 150C. for 2 hr.
Examine under a microscope (15X.) for blisters.

Figure 1. Comparison of thicknesses of immersion zinc deposits produced by the alkaline zincate process and the acid fluoride dip. (Courtesy Electrochemical Society.)



TIN AND CADMIUM IMMERSION COATINGS—The preferred composition and conditions for depositing cadmium by immersion upon alumi-

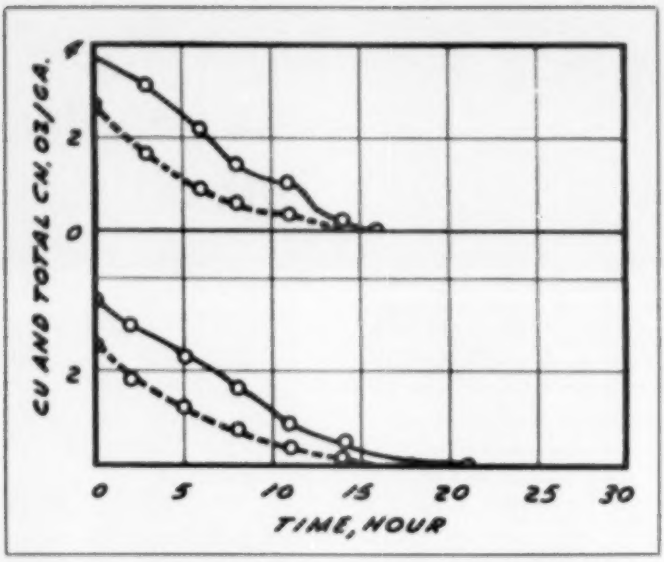


Figure 2. Solid line shows effect of current density on cyanide destruction; broken line shows effect of current density on copper deposition. Top: Anode current density of 6.7 amps/sq. ft. and 32 amps/sq. ft. Bottom: Anode current density of 3.3 amps/sq. ft. and cathode current density of 16 amps/sq. ft. Temperature 190-210F. Based on tests conducted at Doehler-Jarvis Corp. laboratories and described in *Plating* magazine.

num as given by Heiman before the Electrochemical Group were:

Cadmium sulfate (CdSO4)	0.075N (3.5g. L.)
Hydrofluoric acid (HF)	1.0N (100 ml. of 48% acid)
Hydrolyzed glue	2.0g. L.

Regarding the properties of the cadmium immersion deposit, it was reported that they had excellent color and structure and could not be rubbed off. Furthermore, it was brought out that such deposits could act as bases for subsequent heavy copper plates which did not flake or blister when subjected to the bend and oven test.

The preferred composition for depositing tin or aluminum by immersion had the following composition:

Stannous sulfate (SnSO4)	1.3N (181.1 g./L.)
Hydrofluoric acid (HF)	2.0 N (70 ml. of 48% acid)
Hydrolyzed glue	1.0 g. L.
Gesloc	0.2 g. L.
Purified residue acid	1.3 ml. L.
Time	5-10 sec.
Temperature	25C.
Agitation desirable	

It was reported that the immersion tin had good adhesion to the aluminum, although it was not regarded as equal to the zinc immersion deposits for a base for subsequent electroplated coatings. Finishers of aluminum die castings may be interested in exploring some of the possibilities presented by Heiman's research to determine its applicability to production line methods for plating.

CHEMICAL TREATMENT FOR ZINC DIE CASTINGS

A satisfactory chemical solution treatment of the chromate type useful in retarding the formation of white corrosion products on zinc die cast parts in contact with condensed

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moisture has recently been described[7] as consisting of 100 lb. of sodium dichromate and 4 pt. of sulfuric acid per 140 gal. of water. A pH of 1.4 to 1.7 is maintained during operation of the solution, which is carried out at room temperature with mechanical agitation to insure reaching all recesses in the castings. Treatment time in the bath is 17 sec., following which parts are given two rinses in cold running water. Parts are dried at a temperature of 140F., and then painted or used in the as-treated condition.

This solution is successfully used at high production rates on automobile zinc base die castings, including such parts as carburetor castings, fuel pumps and radio antenna holders. Racks used are of stainless steel and require no coating, the parts being hung on hooks on the rack. Prior to the chromating treatment, parts are cleaned and etched in a commercial cleaner.

The coating applied has a brassy or straw-like color; steel inserts were also reported to be coated with about the same color of coating. Any machining to be done on the castings should be carried out prior to the treatment process, since surfaces machined after subjection to the chromate treatment lack the corrosion inhibiting effect that the treatment affords.

DISPOSAL OF WASTE CYANIDE BY ELECTROLYSIS

Many platers at one time or another are called upon to give some thought to methods for safe disposal of waste cyanide solutions. The theory[1] upon which waste cyanide disposal is predicated at one plant is basically that of intentionally applying the opposite of proper plating conditions. In practice, this involves the use of high temperature, insoluble anodes, and vigorous air agitation which results in accelerated decomposition of cyanide. The end product is a relatively non-toxic solution which can be disposed of.

Conditions for destruction of waste cyanides by electrolytic oxidation, utilizing the above principles, described[1] by R. W. Oyler, as they are used at plant of Guide Lamp Division, General Motors Corporation are as follows:

1. Solutions very hot (200F.)
2. Vigorous air agitation
3. Use of copper electrodes
4. Use of as high current density as possible
5. High ratio of anode to cathode area

As a specific example of plant application, the method has been used in treatment of sludge and cyanide bearing liquid from a cyanide copper plating bath that has been treated with barium hydrate and activated carbon. The mixture is washed a number of times with hot water, followed by settling after which the supernatant liquid is decanted into the treatment tank. It has been found that the total cyanide in such a mixture can be destroyed at an average rate of about 1 oz. gal./da. The rate is considerably higher for higher concentrations and diminishes as the cyanide concentration approaches zero.

In summarizing the advantages and disadvantages of this method of cyanide waste disposal, Oyler stated that the advantages of the process are that little attention is required, the metal deposited on the cathodes may be used for plating tank anode material, and solution composition is not critical but may vary from a very low figure almost to the limit of solubility of the material being destroyed.

The principal disadvantage of the process arises under circumstances where large quantities of cyanide must be disposed of. In such cases, it is possible that generator and tank requirements would be so large as to make it advisable to select another method if speed of destruction is of prime importance.

In another report[7] Sperry and Caldwell give the results of laboratory tests and a plant trial on the use of the hot electrolysis method to destroy cyanide in waste copper cyanide plating solutions based on work carried

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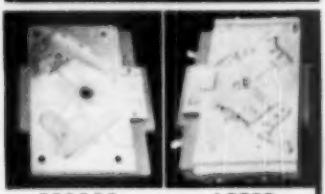

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Important factors in the speed of this method were stated to be the area of the anode and cathode per unit volume of solution, and the amperes per gallon of current passed through the solution.

Figure 2 based on data obtained in the above experimental program shows the effect of current density on the rate of decomposition of cyanide and copper deposition at elevated temperatures.

A description of a 700 gal. tank arranged for maximum utilization of these principles of cyanide disposal cites an effective anode and cathode area each of 0.28 sq. ft./gal. Carbon steel anodes are used in the tank, arranged in rows. A 9 or 12 volt current source is desirable, operating at as high a current density on the anodes as practical.

Among other advantages cited for this method of disposal of cyanide waste by Sperry and Caldwell was that the Plater has a tool with which he is already familiar, and can use without any outside help.

American Electroplaters' Society Research Project No. 10, of which C. Fred Gurnham is chairman and B. F. Dodge, director, is concerned with making a study of the known methods for treating plating room wastes and evaluating their possibe applications. Undoubtedly the information developed will be of value to many Platers' faced with disposal problems.

IMPROVED CORROSION INHIBITING PIGMENT

One of the most promising applications of a new barium potassium chromate pigment has been found to be the formulation of improved primers for the light metal alloys, aluminum and magnesium. This point was brought out as a part of a Staff-Industry Collaborative Report' describing the methods for production of the new-type chromate pigment prepared by M. L. Kastens, Industrial & Engineering Chemistry and M. J. Prigotsky, National Lead Company.

The action of chromate in protecting many types of metal surfaces against corrosion has been recognized and used for a number of years. The use of paint primer coatings containing soluble chromate is an obvious means of utilizing this effect; however, from a commercial standpoint the production of a chromate pigment with properly controlled solubility and other desirable pigmentary properties proved to be the chief problem.

Of particular interest to the users of the light metals, is that tests have shown that the protective effect of the new barium potassium chromate pigment, is, if anything, more pronounced on magnesium and aluminum surfaces than on ferrous metals. In arriving at this new pigment composition, National Lead Company research chemists synthesized and tested a number of double and triple chromate salts.

Barium potassium chromate was finally selected as the most effective because of its relatively low water solubility and the fact that it made available by solution, at a controlled rate, from 20 to 25 per cent more chromate ion per unit weight than the other soluble chromate pigments based on a standard paint formulation. This added chromate concentration enhances the anticorrosive action of paints formulated with barium potassium pigment, or allows the use of a smaller percentage of active chromate for a given anticorrosive activity.

The report pointed out that although barium potassium chromate is a true double salt, apparently crystallized in a regular tetragonal system, it hydrolyzes slowly on exposure to moisture to release only potassium chromate. Almost all of the barium chromate is left behind as a residual coating with substantial protective properties.

Furthermore, it was brought out, the metals potassium and barium do not promote the polymerizaton of the vehicle oils catalytically as do most heavy metals. Another advantage

(Continued on Page 49)

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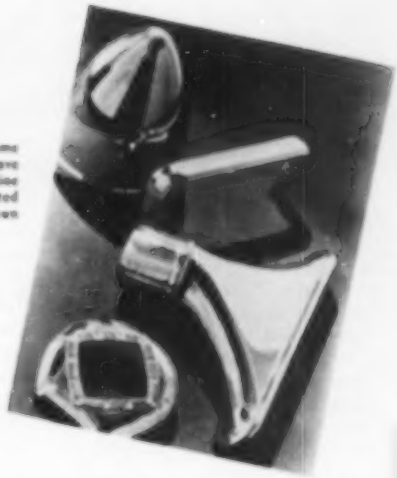
The Alumilite process, a patented anodizing process, has been used on the handles, left. This gives a dense, adherent coating of aluminum oxide which can be both protective and decorative.

Standardized procedures for chrome plating aluminum die castings have now made this a production line operation. Several chrome plated aluminum die castings are shown at the right.



Finishes for Aluminum

BECAUSE of their naturally bright surfaces, aluminum die castings respond most satisfactorily to the mechanical finishing processes such as tumbling, polishing, wire brushing and abrasive blasting.

Designers and engineers sometimes fail to appreciate that, in addition, a wide range of painted, plated and chemical finishes is available. Most of these are suitable for production line operations.

A review of the principal methods for finishing aluminum die castings is presented here, together with a mention of types of products for which each is suited.

Mechanical Finishes

Tumbling. Varying degrees of lustre can be imparted by tumbling aluminum die castings in wood lined barrels together with mineral chips or steel shot and special soaps or abrasives. In its simplest application, tumbling is used to remove fins and burs, but it may also produce high gloss, satin finish or various intermediate surface qualities, depending upon the cycle, tumbling medium, speed, etc.

This is a low cost finish, especially suitable for large quantities of small parts, but also used for large pieces which may or may not require racking in the barrel for uniform tumbling action.

Small fittings, electrical parts, plumbing hardware and irregularly shaped pieces having several surfaces to be finished lend themselves to this treatment.

Polishing and Buffing. Aluminum alloy die castings are quite commonly buffed or polished using cotton, felt or canvas discs and the appropriate abrasives and binders. The popularity of this finish is based on the light color, smooth surfaces and tarnish-resistance of aluminum die castings. Buffing

Editor's Note: This article is intended to familiarize the product designer and engineer with the wide range of finishes which are available for aluminum. Most of them are suitable for production line application. However, no attempt has been made to present a detailed description of the methods or materials involved in any process. Reprints, tear sheets or other reference will gladly be forwarded to anyone desiring further and more detailed information concerning any phase of finishing aluminum die castings.

and/or polishing produces an acceptable final finish for many purposes.

Kitchen utensils, portable tools and many types of product housings can be finished this way. An effective combination of these surfaces, satin and bright, has also been used effectively.

Scratchbrushing. Rotating wheels with stainless steel, brass or nickel-silver wire brushes impart a scratch surface which is attractive. This may be varied by using softer, finer wire brushes to produce a satin finish. The play of light on a wire brushed surface adds to the appearance of decorative home accessories, advertising displays and giftwares.

Abrasive Blasting. An economical way of obtaining a uniform matte surface is abrasive blasting. This eliminates the need for separate flash and bur removal operations and also may sometimes produce mechanical improvement in the surface due to a slight cold-working action of the abrasive shot.

This process is sometimes used as a preliminary surface treatment, followed by polishing of the raised areas to give an effective and inexpensive combination of satin and bright surfaces.

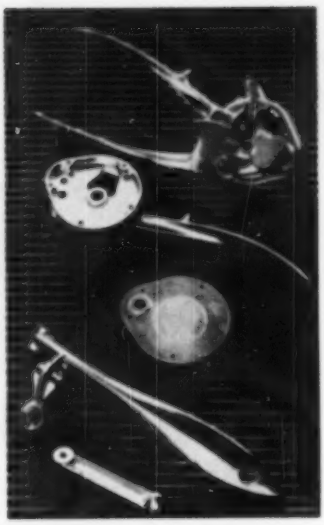
Painted Type Finishes

Some of the mechanical processes mentioned above may be required to prepare the surface for subsequent coatings. Under certain service conditions, a chemical treatment of the surface prior to painting may also be desirable.

Organic Finishes. The decorative value of organic coatings applied to metal products is widely recognized. No special problems surround the application of such coatings to aluminum die castings, whether by spraying, dipping or brushing. Standard practices may be used.

Careful cleaning to remove grease and soil is the principal preliminary step, although service conditions sometimes make a preparation of the surface with chemical treatments desirable for improved paint bond.

Organic finishes include many formulations—paints, lacquers and enamels—air dried and baked—glossy, semi-gloss, hammer-type, crackle, wrinkle and many specialty finishes. All are applicable to aluminum die castings.



Still most popular are various mechanical finishes for aluminum: polishing, wire brushing, sand blasting, satin finishing, tumbling.

In addition, a group of silicone coatings with reported high temperature resistance has been introduced. This should be useful for heaters, burners, electric irons and similar units.

Plated Finishes

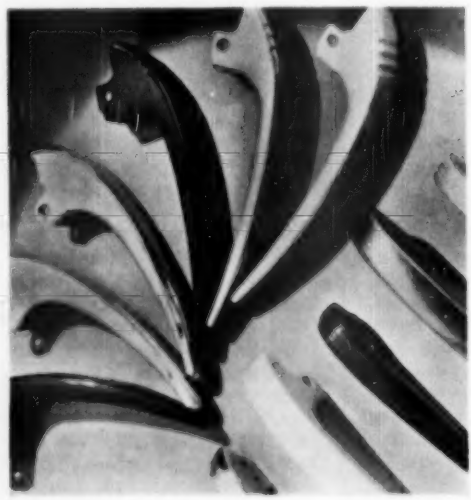
Only within the past couple of years has the electroplating of aluminum die castings come into prominence as a production process. Now it is being used successfully for such products as cameras, hardware, escutcheons, costume jewelry.

While this is one of the most difficult and expensive methods for finishing aluminum, the bright blue-white color of chrome plate is sometimes an essential to customer acceptance. A successful method of depositing zinc coatings directly on the aluminum as a base for the subsequent copper-nickel-chrome plating is being introduced for production processing. It is possible to plate with brass, nickel, black nickel, silver, gold and other metals. Hard chrome plating inside die cast aluminum cylinders is being used for abrasion resistance.

Chemical Finishes

Chemical treatments are used to etch, brighten or color the

(Continued on Page 50)



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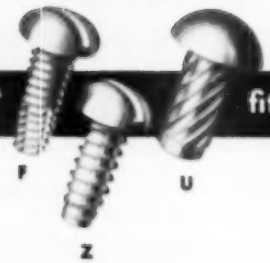

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PRODUCTION CLINIC

(Continued from Page 44)

found with the new pigment was its low tinting strength; this makes it suitable for inclusion in finish coats in which the coloring effect is obtained by other pigments. Thus, for some applications such mixed pigment paints can be made to serve both as anticorrosion primers and cover coats.

NATURAL PATINA ON ZINC

The details of a new process developed in Germany for the production of a "true" patina on all types of zinc and zinc alloy parts without the need for electroplating the parts prior to coloring have recently been described in a British journal.

The process is said to produce a uniform color on composite assemblies, and is described as being successfully used in several large metal-working firms in Germany under license agreement.

The details of the coloring process first involve a treatment of the zinc parts, without any preliminary grinding or electroplating, in a solution consisting of 23.5 g./L. potassium hydroxide and 9.5 g./L. sodium hydroxide, maintained at near the boiling point for a few seconds until evolution of hydrogen is observed to take place.

The parts are then removed, and after a thorough rinse in cold water are suspended in a solution consisting of 37.0 g./L. copper sulfate and 3.2 g./L. of commercial, concentrated sulfuric acid.

Within a short time, according to the operating procedure described, a dark brown to black coating is formed on the surface of the parts. Using a soft brush the parts are given a light scrubbing with water, following which they are dipped in hot water and finally dried.

It was suggested that parts treated in this way be heated by some suitable means such as an open flame or on a hot plate. The parts are then dabbed with a solution made up of 120 g. copper nitrate and 96 g. water. An ordinary paint brush with short bristles was stated to be satisfactory for this dabbing operation.

Following this, parts are again heated until the patina which forms has the desired intensity. Colors on the lighter side can be obtained by using more dilute solutions, while for darker colors, it is advisable to use more concentrated solutions. Furthermore, it was brought out that a moss color is obtained by treating the patinated parts with a 10 percent hydrogen peroxide solution.

After the treatments the parts are brushed with a rotary brush, used dry, in order to obtain a gradual transition between the background coloration and the actual patina. Also, a coating of wax or lacquer can be used to protect the colored surface against abrasion and to give it a brighter luster.

CHARACTERISTICS OF ANODIC FILMS ON ALUMINUM

Two papers were presented at the 94th Annual meeting of the Electrochemical Society, held in New York City, dealing with the production and characteristics of anodic films produced on aluminum alloys. In one of these R. L. Burwell, Northwestern University, and T. P. May, International Nickel Company, described the results of tests carried out on the measurement of permeability characteristics of anodic films on aluminum, based on studies carried out at the Naval Research Laboratory.

Most finishing engineers are familiar with the fact that the production of anodic films on aluminum by anodizing in solutions of chromic, oxalic, or sulfuric acids is employed extensively to increase the corrosion

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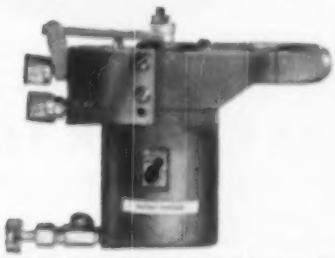

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resistance of aluminum and its alloys. However, it was pointed out by Burwell and May that investigations of this process, which is widely used commercially, have in general yielded little quantitative data on the permeability of bulk anodic films to ions and molecules, although this may be of great importance in determining corrosion resistance.

To extend the knowledge on anodic films produced on aluminum, four methods were used by Burwell and May to give quantitative data bearing on permeability of the coating. These methods involve: (a) rate of diffusion of salts through the anodic film; (b) rate of osmosis using the film as a membrane; (c) rate of transport of water through the film; (d) conductance of the film using electrolyte electrodes.

It was reported that the anodic layer formed, using aluminum foil for experimental purposes, consists of nearly pure aluminum oxide when formed in chromic acid but contains 10-13 percent SO_4 and a few percent water when prepared in sulfuric acid.

The film is amorphous to X-rays. Electron microscopy, gas adsorption data, the dying of anodic films, and the demonstration that anodic film grows at the interface between aluminum and the film, and not at that between film and acid, all show that the bulk film is penetrated by myriads of submicroscopic pores.

This brings up one point of importance to corrosion resistance of commercially anodized aluminum articles, namely the effect of "sealing" the anodic film. It was brought out by Burwell and May that exposure to boiling water for 15 minutes reduces the permeability of the film by a factor of 100. This is in agreement with the well known increase in corrosion protection afforded by sealing anodized aluminum and with the decrease in surface area as measured by gas adsorption.

(*) Process of United Chromium, Inc. U. S. Patent 2,250,556; see also Coyle, Proc. Am. Electroplaters' Soc., 113 (1941).

(*) See also The Iron Age p. 69 (Nov. 3, 1949).

(*) Oyler, Plating P. 341 (Apr. 1949).

(*) Sperry and Caldwell, Plating, p. 343 (Apr. 1949).

(*) Gurnham and Dodge, "The Present Status of Plating-Room Waste Disposal." A paper presented at the 36th annual Conv. Am. Electroplaters' Society.

(*) Kastens & Prigotsky—Ind. & Eng. Chem., p. 2376 (Nov. 1949).

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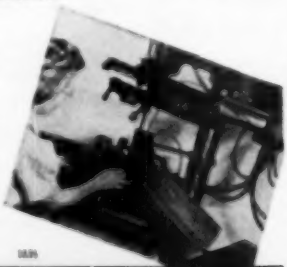
With the Bellows Rotary Work Feed Table you can feed 4, 6, 8, 12, or 24 loaded jigs to the spindle automatically and at speeds ranging from 54/100ths of a second to 17/100ths of a second.

Combine the Rotary Feed Table with the Bellows "Controlled-Air-Power" Drill Press Feed and you have fast automatic operation. All the operator has to do: load the part.

If you operate one or more drill presses on short, medium, or long production runs you can cut drill press operation costs 50% or more with Bellows "Controlled-Air-Power."



• WRITE FOR FREE BULLETIN

Address Dept. DC 250

The Bellows Co.

AKRON 9, OHIO

FINISHES FOR ALUMINUM

(Continued from Page 46)

surface of aluminum die castings.

Anodic Finishes. The controlled oxidation of the aluminum surface is produced by either chemical dip or electrical oxidation and provides a harder, tougher surface film.

Anodic finishes can be produced in a variety of colors but black anodizing is most commonly used. The high silicon alloys used for general die casting purposes produce a streaked or irregular appearance when lighter colored anodic films are applied.

Black anodizing is used extensively for severe outdoor exposure, such as railway signal housings, agricultural equipment and similar products. The anodic film is integral with the metal and resists chipping, peeling, abrasion or corrosion.

Cowles SM CLEANER

A Non-Foaming Cleaner for-

1 • • • use as an electrocleaner (cathodically, anodically) on steel when exceptionally high current densities, tank design or type of work tend to produce excessive foaming.

2 • • • use as a detergent in all types of washing machines for die castings, steel, brass and copper.

Because it is formulated with water conditioners, Cowles SM Cleaner is especially effective under hard water conditions.

PROMPT SHIPMENTS FROM CONVENIENT WAREHOUSE STOCKS

• • • • ***COWLES TECHNICAL SERVICE***
gladly furnished upon request

Cowles Chemical Company

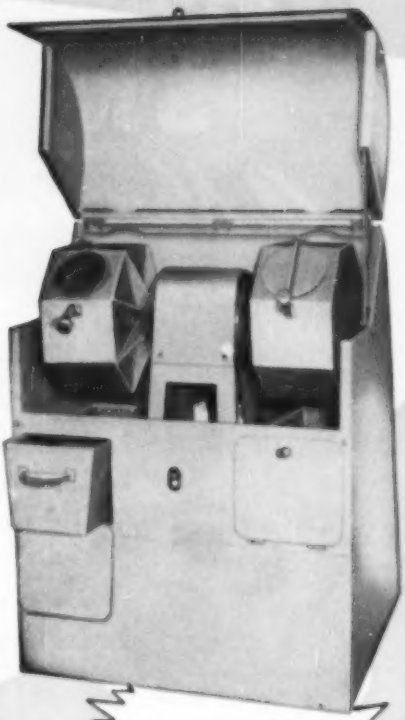
METAL CLEANER DEPARTMENT

7016 EUCLID AVENUE CLEVELAND 3 OHIO

New in Precision Barrel Finishing

ALMCO Supersheen MODEL DBO-1

FOR A BETTER FINISH FASTER ON SMALL PRODUCTION RUNS



The *newest* addition to America's Most Versatile Line of Precision Barrel Finishing Equipment. Ideal for small shops, small production runs, experimental processing. All welded steel construction. Sturdily built to take it! Easily loaded and *mechanical* unloading and separating mean *lower* operating costs. *Removable* watertight drawers with drain plugs eliminate need of drainage facilities. Safety hood and chain guard assure *maximum* safety.

It's the last word in compactness, advanced precision barrel design. Write today, Dept. D-2, for full DBO-1 details.

ONLY $490.00 F.O.B. Albert Lea, Minn.
PROMPT DELIVERY

Cuts Costs up to 90%

Free Engineering Clinics

Eight *strategically* located SUPERSHEEN Engineering Clinics have been established to provide you with *quicker* and *better* sample processing—and to keep you *fully* informed of the latest developments in precision barrel finishing. These are YOUR clinics to use *without obligation*. Bring us your problems and actual parts for sample processing and complete production cost data—OR you may send parts for sample processing if it is not convenient to personally visit the Clinic nearest you.

The SUPERSHEEN line consists of (1) Advanced Design *Precision* Deburring and Finishing Barrels in sizes from 8" x 16" up to 60" x 30". (2) *Automatic* loading, unloading and separating equipment. (3) A *vastly* superior grinding and finishing medium in two grades and 9 sizes.

The SUPERSHEEN Process can be applied to produce the *precise* result in a *wider* range of work—from *fast* deburring to the *gentle* honing of stampings, castings, forgings and machined parts . . . even where micro tolerances are a must! The "before and after" photo at left is unretouched.

ALMCO Supersheen

DIVISION OF QUEEN STOVE WORKS, INC.

FACTORY AND GENERAL OFFICES ALBERT LEA, MINNESOTA

Useful Literature

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

No. 28—Polishing and Buffing with Power Operated Brushes:

A comprehensive 16-page manual from The Osborn Manufacturing Company, Cleveland, offers a full analysis of the methods and results to be obtained by polishing and buffing with power operated brushes.

No. 29—Die Lubricant Sample and Leaflet:

A leaflet to which is attached a package of die lubricant has been received from Reardon Products, Peoria, Ill. This silvery colored material is called Grafsite, and is said to be in successful use for ejecting die castings and for lubricating moving parts of dies.

No. 30—Working of Tool and High Speed Steels:

Technical data certified by the metallurgical staff of Allegheny Ludlum Steel Corp. have just been published and are now available in a 16-page booklet, "The Working of Tool and High Speed Steels."

No. 31—Melting Crucibles for Magnesium without Contamination:

Crucibles described in literature from The American Tank & Fabricating Co., Cleveland, are designed specifically for melting magnesium alloys, and contain no copper or nickel contamination. Ladles and skimmers are also available.

No. 32—Complete Line of Drill Presses and Accessories:

Catalog No. D50 from Atlas Press Co., Kalamazoo, Mich., shows a complete line of drill presses and accessories. These presses, with 15" capacity, are available in high or low speed models, with choice of full-tilting or production oil table, Jacobs chuck, or No. 1 or No. 2 Morse taper spindle.

No. 33—Quick Change Chucks:

A way of giving "multiple spindle range" to single spindle presses and radial drills is described in a new folder from Scully-Jones describing their quick change chucks. These easily changed chucks allow rapid switching from one tool to another in sequence operations like, drilling, reaming and tapping.

No. 34—Handbook on Chromium Chemicals:

A 32-page handbook on chromium chemicals has been published by Diamond Alkali Company of Cleveland, Ohio, for chemists, metallurgists, engineers and others interested in a comprehensive coverage of the subject. Chromium plating, chromate type films and other metal treatments are included.

No. 35—Improved Corrosion Resistance for Aluminum:

Improved corrosion resistance of aluminum alloys and superior paint adhesion are offered by a new process called Lyfanizing, described in brochure No. 4998 from Neilson Chemical Co., Detroit. This treatment is said to stand up under thousands of hours of salt spray testing.

No. 36—Twelve Technical Bulletins on Die Casting and Permanent Mold:

A series of twelve technical bulletins from Monarch Aluminum Mfg. Co., Cleveland, issued at monthly intervals, discusses various phases of the die casting and permanent molding processes. These bulletins are intended primarily for design engineers and production executives.

No. 37—Rotary Work Table Feeds 4 to 24 Jigs to the Spindle:

A bulletin from The Bellows Co., Akron, gives all details and specifications for a new Controlled-Air-Power work feed table which is able to feed 4, 6, 8, 12 or 24 loaded jigs to the spindle automatically at speeds ranging from 54/100ths of a second to 17/100ths of a second.

No. 38—Complete Range of Die Casting Alloys:

Literature is available from Federated Metals Div., American Smelting and Refining Co., concerning their complete range of die casting alloys—aluminum, copper and zinc base alloys.

No. 39—Chromate Dip Treatments Give Bright, Bronze or Colored Finish:

Final finish which may be bright and chrome-like, bronze, iridescent or colored is obtained by patented chromate-dip treatment described in literature from Allied Research Products, Inc., makers of Iridite. May be used either as pre-paint process or final finish.

No. 40—New Tumbling Barrel for Small Production Runs:

A new tumbling barrel specially designed to handle small production runs for deburring or honing castings, stampings, machined parts, etc., has been announced in literature issued by Almco Supersheen Division of Queen Stove Works, Inc. The barrel, designated the DHO-1, features mechanical unloading and separating.

No. 41—Details of Annual Die Casting Award Are Available:

A folder from the American Die Casting Institute contains full details about the annual Doehler Award to be presented for outstanding contributions to the advancement of the die casting industry and process. Nominations for the Award must be submitted before April 30. Nature of the award, the basis on which it is to be made, and other background information is included in the folder.

No. 42—All Purpose Aluminum Cleaner:

A cleaner designed specifically for removing all types of soil from aluminum is discussed in a folder from The Diversey Corp. This powdered alkaline material is identified as Diversey No. 36, and is reported to inhibit corrosion, provide instantaneous wetting action, offer complete emulsification and other special properties.

CIRCLE NUMBERS ON THE CARD AND MAIL!

No. 43—Full Line of Burs and Accessories:

A 40-page catalog received from Pratt & Whitney Div. of Niles-Bement-Pond Co., shows a full line of Keller burs and accessories. Three types are available: ground high speed steel, ground carbide and file-cut burs.

No. 44—Four Die Coatings with Different Properties:

Included in the current issue of Foundry Practice (No. 97) published by Foundry Services, Inc., is a description of four die coatings for the casting in zinc and aluminum.

No. 45—Low Cost Copper Anodes Feature "Tailored" Shapes:

A bulletin from Wagner Bros., Inc., of Detroit tells about their new Lectrocup electrolytically deposited copper anodes which feature new shape "tailored" to fit any length or width of tank. It is reported to be the lowest cost form of copper anode.

No. 46—Data and Specifications for Keyway Push Broaches:

The Kase Machine Company has released a new catalog containing engineering data, specifications and prices of their complete line of Glenny push broaches and eccentric adapters. These keyway broaches are available in 32 standard sizes from stock. Catalog lists diameter, overall length, interchangeable cutting blade dimensions, and number of teeth per blade.

NEW Products

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

PATENTED TACK TESTER

The Zapon Tack Tester, a small, easy-to-operate device for measuring film tackiness has been patented by the Atlas Powder Company for manufacturers who use industrial finishes.

The device consists of a counter-balanced angular piece of aluminum with an inch-square section wrapped with foil. For most tests, the foil-wrapped portion, pressed down with a one-pound weight, is placed on the film to be tested for five seconds. If, after the weight is removed, the foil pulls away from the coated surface in less than five seconds, the film can be considered to be tack-free. The calibration angle, weight and time of contact may be varied, if necessary, for special types of coatings.

Zapon Tack Testers may be obtained by circling No. 1 on the attached card.

BELT OF BELT GRINDER SET AT ANY ANGLE

A belt grinder, the Expeditor, which can be set at any angle has been announced by the H. L. Ramsay & Co., La Grange, Ill. The Expeditor is mounted on an axis that centers at the motor shaft, and with one turn of a clamp nut the abrasive belt can be set at any

angle. Several Expeditors can be set above each other so that the contact wheels or platens of the several may be directly in front of the operator. In this set-up the worker can rough, semi-finish and finish grind with little movement.

With this unit at the elbow of milling machine operators, they can deburr, remove cutter marks, break corners, etc.

The Expeditor is designed for free belt operation; form wheel work, or contour grinding; line contact grinding when much stock is removed; for platen precision grinding either above or below. For additional information circle No. 2 on the attached card.

SMALL, CARBON STEEL TAPS

A line of small carbon steel taps recently introduced by Woodruff & Stokes, Quincy, Mass., is available in standard or special sizes up to No. 2 (.086 inches), and has up to 260 threads per inch. Between 2,500 and 4,000 threading operations per tap are reported.

The cut thread and flutes are highly polished to reduce drag and fatigue. Cutting edges have great strength due to the radial chamfer and extra chip clearance is provided by the radial flute. In addition, special heat treating methods have been developed which, applied to carbon steel, are said to produce an extremely hard cutting edge and increased toughness throughout the length of the tap.

Taps having special pitch diameter or thread profile are available on special order. For further information circle No. 3 on the attached card.

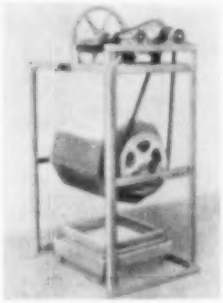
HAND TAPPER FOR SMALL HOLES

The H. D. Harder Tool Specialties Co., Kalamazoo, Mich., announce a new hand tapper, Model H. T. 250. The unit is a bench type machine designed for sensitive, precision small hole tapping. It is primarily intended to be used by tool and die shops, school and service shops, experimental departments, light assembly production plants.

Four collets, which handle standard tap shank sizes and taps from No. 0 through ¼", are supplied with each machine. The collets, it is claimed, provide positive drive through, due to square socket and shank design. A knurled threaded collar (removable by hand) holds and centralizes collet and tap. Either right or left hand taps may be used. For additional information circle No. 4 on the attached card.

IMPROVED BEARING SUPPORT GIVES RUGGED TUMBLING UNIT

A new tumbling machine has been announced by the Lapomatic Industries, Inc., manufacturers of Tumb-L-Matic processes, equipment and supplies.



One of the main improvements claimed is the mounting of the bearings on the raised frame for positive direct support to all drive mechanism. Ball bearings equipped throughout, the shaft housings are now supported by the frame itself.

Chain gear drive with constant speed motor provides an unvarying power at all times, an essential factor in all tumbling processes. When a change of work calls for a different speed the unit can be converted to the speed required.

This model is especially designed to handle deburring, definning, cutting, smoothing, polishing of surface metals for plating, etc. For additional information circle No. 5 on the attached card.

CIRCLE NUMBERS ON THE CARD AND MAIL!

TWO TYPES OF PEENING AND CLEANING ABRASIVE

The Steelblast Abrasives Company of Cleveland, Ohio, manufacturers of Steelblast chilled iron shot and grit, used to clean castings, forgings and heat treated parts by the blast cleaning method, announce two new products which are now in production.

Five Star malleablized shot and grit for general abrasive blast cleaning, is said to last three to four times longer with reduction of wear on equipment up to 65 per cent.

Kut-Steel genuine steel shot with hardness of 46-52 Rockwell and 270,000-300,000 psi tensile for shot peening is reported to last from 20-30 times longer than other types of shot and giving the same or greater arc height.

For additional information circle No. 6 on the attached card.

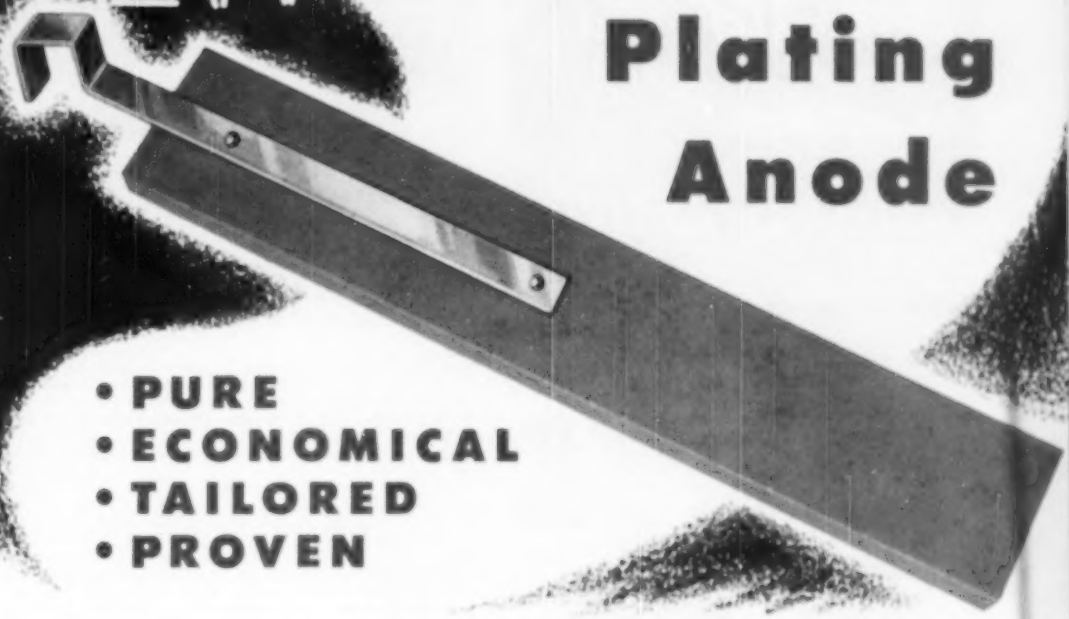
"UNDERSLUNG SPINDLE" FEATURED ON BUFFING, POLISHING MACHINE

A new buffing and polishing machine has been developed by The Vonnegut Moulder Corporation, Indianapolis, Indiana, makers of the Morschke line of grinding and buffing machines and the Vonnegut Polishing Head.

The novelty of this design is in the so-called "underslung spindle."

(Continued on Page 56)

NEW LECTROCOP Plating Anode



- PURE
- ECONOMICAL
- TAILORED
- PROVEN

LOWEST COST FORM OF COPPER ANODE —plus better performance, versatility and safety . . . that's the new Wagner contribution for plating efficiency! You can now eliminate most of your oval anode headaches and gain these important money saving advantages:

- Quality is constant—99.98% *pure* electrolytic copper.
- Long steel hook is included, eliminating cost and labor of attaching threaded hooks.
- You may have any length or width to fit various tank sizes or work, tailored to your order, standard thickness approximately ½".
- Standard sizes are available to fit conventional anode bags.
- Long steel hook outlasts the copper, reducing danger of breakage of anode near surface.
- Efficiency is proven. Many leading plating plants and departments have already changed over to LECTROCOP electrolytically deposited anodes.
- Fabrication is immediate, in our Detroit plant. No long shipping delays.

For your convenience, LECTROCOP is shipped in a 250 pound package, steel strapped and palletized. Why not call in the Wagner Brothers representative in your area? He'll assist you in determining the correct LECTROCOP anode for your work. Or send for folder describing LECTROCOP and the other distinctive Wagner Anode Products.

Wagner BROTHERS INC.

Wagner Bros., Inc., 404 Midland, Detroit 3, Michigan

Send ☐ **LECTROCOP Bulletin**
☐ **Anode Products Folder**
☐ **Name of representative in my area**

Name _____ **Title** _____

Firm _____

Address _____ **City** _____

Zone _____ **State** _____

TELL US *Your Problems.*

SEND SAMPLE ASSEMBLIES FOR FREE ESTIMATES NOW!

Use a DETROIT POWER SCREWDRIVER

Discard the out-of-date, slow hand method of driving screws . . . Do it this speedy, time and labor saving way that will boost your production and bring costs down.

IMMEDIATE SHIPMENT . . .

on certain models. Detroit Power Screwdrivers are hopper-fed and furnished in three models . . . Will drive all types of screws, as fast as one a second . . . All driven to uniform tension . . . Will not strip threads or mar heads.

Model A

A sensitive but sturdy machine for driving small screws in delicate assemblies. Capacity, No. 2 to No. 6 screws. Both bench and pedestal types. Designed for maximum service, easy operation and speed.

Model C

A powerful machine for heavy-duty assembly work. Every part husky enough to stand driving hardened cap screws to a tension of 50 foot pounds. Capacity, ¼" to ⅝" diameter screws.

Model B

A real production machine designed for constant service. It drives a range of screws of all types from No. 6 to ¼" diameter, up to 2" in length. Both bench and pedestal types.

Come and See Us, Booth 939, A. S. T. E. Show, Philadelphia, April 10-14.

Write for Catalog

SEND SAMPLE ASSEMBLIES FOR ESTIMATE

DETROIT POWER SCREWDRIVER CO.

2821 WEST FORT ST. DETROIT 16, MICHIGAN

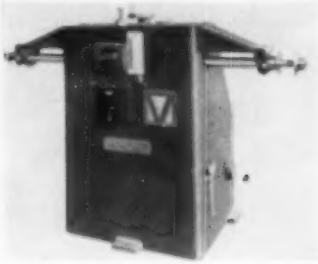
NEW PRODUCTS

(Continued from Page 54)

This design, the company claims, has a number of advantages, among which are:

1. Unusual rigidity of a relatively long, thin spindle is provided because the bearing support is entirely above the spindle. With this construction neither depth or width of the overarm need be restricted.

2. Nor are there any structural interferences for spacing other



bearings to best advantage along the underside of the bearing support or for locating the motor and power transmitting details.

3. The design and method of manufacturing the frame provides maximum dependability of accurate bearing alignment as well as strength and rigidity.

For additional information circle No. 7 on the attached card.

TRIAL PAINT FINISH SERVICE TO DETERMINE PROPER METHOD

A testing setup has been introduced by Binks Manufacturing Company, Chicago, to determine whether or not a product can be painted automatically. Using actual products, both automatic and manual spraying equipment and methods are tried.

This new service introduced by Binks is intended to provide manufacturers information concerning the most efficient and effective way of spraying. Equipment of the latest type is employed, including an automatic reciprocating machine, and an automatic spindle machine.

Samples can be sent for processing. For additional information circle No. 8 on the attached card.

SELF-LOCKING SETSCREW FOR VIBRATION-RESISTANCE

A newly designed setscrew which features an interference fit at its upper section, is reported to provide triple-locking action against excessive vibration. No lock screws, wires, impinging locking screws or deformed or riveted threads are required.

A combination of interference fit, tension and locking of the setscrew against the shaft provides the improved gripping action. Lower part of the Zip-Grip self-locking setscrew which enters the hole first has standard thread, but the upper part has a larger pitch diameter for interference fit. It is manufactured by Set Screw & Mfg. Co., Bartlett, Ill. For additional information circle No. 9 on the attached card.

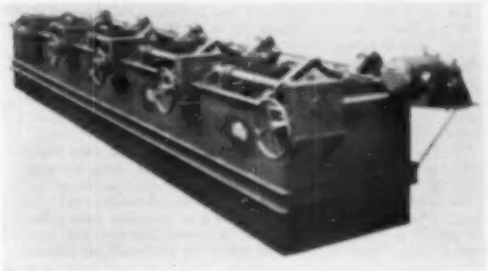
SINGLE COAT BAKING ENAMEL GIVES HAMMER-TYPE FINISH

A baking enamel which produces a hammered-type surface with a single coat application has been introduced by the Brooklyn Varnish Mfg. Co. This can be applied over castings without polishing or buffing because small surface defects are completely covered.

Called Tuf-On Hammer-Namel, this new organic coating is reported to resist abrasion and chipping. Baking cycle requires 20 minutes. For additional information circle No. 10 on the attached card.

HIGH-CAPACITY BARREL PLATING MACHINE

Daniels Plating Barrel and Supply Company, Newark, New Jersey, has introduced a five-cylinder plating barrel unit having a common steel tank. Heretofore, the largest Daniels plating barrel with a common tank consisted of two cylinders; however, a newly-designed ratio lift affords an infinite number of cylinders in a common tank of double-welded construction, with or without rubber lining, as pictured here.



The cylinders in this type machine may be constructed of the standard heavy reinforced bakelite, moulded hard rubber, or HT lucite.

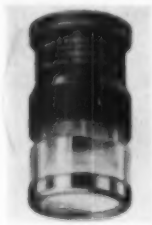
As a result of the contact design, many parts may be plated at high-current densities, to improve plating time and throwing capacity. These machines can be fitted with two flanged overflows for maintaining solution levels and with flanged fittings for constant filtering lines.

The advantages claimed for this type machine include: extremely high production, simplified filteration of solutions, ease in handling work, efficient plating and reduced maintenance with single motor drive. For additional information circle No. 11 on the attached card.

POCKET COMPARATOR COMBINES MANY INSPECTION FUNCTIONS

The Pocket Comparator is a high-precision optical measuring instrument for the inspection of small parts or small dimensions on large parts. It is a multi-purpose inspection instrument for use instead of the previous practice of using a different device for checking linear measurements, circles, angles, radii, etc.

The Pocket Comparator embodies a new principle by permitting the user to compare through a magnifying lens, the part to be checked against a finely calibrated pattern or reticle. The lens is a triplet design aplanatic type of great accuracy and has a magnification of approximately 7 to 1. The instrument was developed and is manufactured by Bell and Howell Company and is distributed by National Tool Company, Cleveland, Ohio.



The reticle of the Pocket Comparator is calibrated for measuring lengths, widths, complete circles, radii and angles. The upper part of the reticle has lengths graduated in steps of 1.64", 1.32", 3.64", 3.32", 1.8", 3.16" and 1.4". There is also a linear rule of 1.2" with .005" increments, and a 10 mm linear rule with .2 mm increments.

Circles are shown graduated from .002" to .050" diameter and from 1.64" to 1.16" diameter. The lower half of the reticle is patterned to measure angles between 0 and 90 degrees in steps of 5 degrees, and to measure radii from 1.16" to 3.8".

The Pocket Comparator separates in the middle for two purposes: the first is to permit cleaning the interior optical surfaces, the second, for adjustment of focal length to meet the eye requirements of the individual using the instrument. Transparent plastic material is used between lens and reticle to permit the entrance of light on the reticle and work to be measured.

For additional information circle No. 12 on the attached card.

TRY

TUMB-L-MATIC

PROCESSES

EQUIPMENT • COMPOUNDS • SUPPLIES

and techniques!

TO SPEED-UP FINISHING

and SAVE *automatically!*

Today TUMB-L-MATIC is the big word in metal finishing. Gearing important new developments in automatic finishing to years of experience in applying scientifically combined equipment, compounds, supplies, and techniques to all metals including diecastings, stampings and other types of pieces, TUMB-L-MATIC PROCESSES deburr, cut, smooth and polish . . . or prepare metal surfaces for plating, in a fraction of the time it takes by other methods . . . and at a fraction of the cost.

AND REMEMBER, TUMB-L-MATIC makes *the complete line* of tumbling and burnishing equipment, compounds and supplies.

Try It Before You Buy It!

Our experienced engineers analyze a sample (or detailed description) of your product, recommend an individualized, low-cost TUMB-L-MATIC PROCESS complete with production data which enables you to figure finishing costs before you invest a cent. Write and tell us about your product—or better still, send a sample.

Lupomatic INDUSTRIES, INC.

4510 Bullard Avenue, New York 66, New York

It costs more per pound. But it cleans better, goes farther, cleans more surface per pound of cleaner; it's an economical buy.

Parco Cleaners are specially formulated to clean and condition metal surfaces to provide a better base for finishes. They're formulated to reduce cleaning time, operating temperatures, and amount of cleaner used.

In the Parco Cleaner line there's bound to be one that's especially suited for your requirements. A production test with the Parco Cleaner that fits your need will save you money on cleaning. Write today!

Emulsion and Solvent Type—Excellent for removing oil, grease and soil from metal surfaces. Spray and immersion types.

Acid Type—Want to remove rust and scale from iron and steel? Here are cleaners to do the job efficiently, economically.

Alkaline Type—A wide range of light and heavy duty, spray and immersion types, for removing oil, grease and soil from metal surfaces.

Bonderite, Parco, Parco Lubrite—Reg. U. S. Pat. Off.

Parker RUST PROOF COMPANY
2180 E. Milwaukee Ave.,
Detroit 11, Michigan

BONDERITE—Corrosion Resistant Paint Base • **PARCO COMPOUND**—Rust Resistant
PARCO LUBRITE—Wear Resistant for Friction Surfaces

NEW PRODUCTS

(Continued from Page 57)

IMPROVED SOUTH BEND HANDLEVER BED TURRETS

The South Bend Lathe Works are now producing an improved handlever bed turret as an accessory for their 9", 10", and 13" swing lathes. This bed turret is so designed that by following simple instructions the user can accurately fit it to his lathe.

Such an installation will make possible the economical production of precision parts, but will not change the basic lathe in any way. The turret can be removed and the tailstock quickly remounted for regular lathe work.

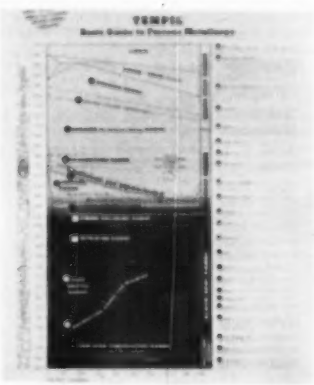
The Handlever Bed Turret mounts on the inside bed ways and the turret base can be locked in position at any point along the usable length of the lathe bed. The turret head can be positioned close to the spindle nose because the base is designed to clear the saddle wings. This eliminates excessive overhang of the turret tools. Double gibs provide precision adjustment for the turret slide and three needle bearings assure long life and easy action for the handlever assembly.

For additional information circle No. 13 on the attached card.

CHART IS BASIC GUIDE TO FERROUS METALLURGY

Tempil® Corp. has announced that a fourth printing of the Tempil® "Basic Guide to Ferrous Metallurgy" is now off the presses and again available.

This chart shows the working characteristics of steels in temperatures from minus 300°F to 2900°F. All the important temperature zones, including hot working, annealing, normalizing, stress relieving, carburizing and preheating for welding are clearly defined. Temperature ranges are shown in nineteen colors approximating the characteristic hot-body radiant hues. At the right of the chart 23 fundamental metallurgical terms are defined and explained. A diagram symbolizing the change in grain size with temperature is shown at the left.



This plastic-laminated wall chart measures 16½ inches wide by 21 inches long. It provides a handy reference source for the engineer, metallurgist and skilled worker. Available without charge to industrial executives. To obtain chart, circle No. 14 on the attached card.

PLASTIC STOPOFF COATING TO MASK METALS DURING PLATING

A new type of plastic coating called Maskcoat No. 2 has been introduced by Western Coating Co., Pasadena, Calif., to serve as a stopoff material suitable for use with chromium, copper, cadmium, nickel or other plating solutions.

This material is said to have excellent adherence, but can be stripped off readily when the plating operation is completed. For additional information circle No. 15 on the attached card.

RELEASE FILM SHOWING PAINT SPRAY METHODS

"White Magic," a 30-minute, 16 mm. sound movie in color, showing the latest techniques in the production, use, and spray application of "Dulux" white enamel for home appliances, has been released by the Finishes Division of the Du Pont Company. Since "Dulux" was developed in Du Pont laboratories more than 20 years ago, it has become widely used for refrigerators and other home appliances.

The film was made on the production lines of nationally known manufacturers as well as Du Pont plants in Toledo, Ohio, and Chicago, Ill.

Hints of value to manufacturers and their paint crews are contained in the film. Showings to interested parties may be arranged by writing to E. I. du Pont de Nemours & Company, Finishes Division, Wilmington, Del.

NEW RESEARCH LAB FOR COWLES CHEMICAL

Cowles Chemical Company, Cleveland, Ohio, has moved its research and development laboratory from the campus of Syracuse University to greatly enlarged quarters at 105 South Townsend Street in downtown

New Cowles Laboratory

Syracuse, N. Y., according to announcement by Dr. C. W. MacMullen, technical director of the company.

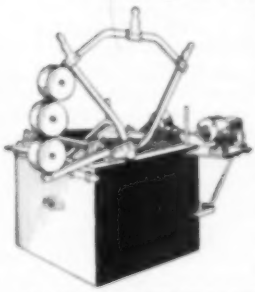
Research projects at Syracuse include development of heavy chemicals in the silicate field, laundry products, metal cleaners, detergents and bactericides for the food processing industries, organic research and the engineering of new processes and equipment for the company's three plants located at Lockport and Skaneateles Falls, N. Y., and at Sewaren, N. J. These projects are conducted by a staff of twenty chemists and engineers under the direction of Dr. MacMullen.

PENNSALT NAMES LANE PUBLIC RELATIONS HEAD

Formation of a Public Relations Division of the Pennsylvania Salt Manufacturing Company, with Cleveland Lane as manager, has been announced by George B. Beitzel, president.

Mr. Lane, who previously served as Pennsalt account executive with Geare-Marston's Public Relations Department, came to Pennsalt from the Home Life Insurance Company in New York where he was manager of the Field Service Division. Before his four years of war service with the Army, Mr. Lane was associated with the Brush-Moore Newspapers in Ohio.

DANIELS
Plating Barrel & Supply Co.
featuring the efficient OLS



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Points of superiority in the O. L. S type barrel are—

Quick loading and unloading. Faster plating through low internal resistance. Maximum current distribution with fewest current leaks. Reduced maintenance.

Write or 'phone for more complete information.

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What soils do you find most difficult to remove from metal surfaces? For free information about better metal-cleaning methods, mail the coupon to Oakite Products, Inc. 34G Thames St., New York 6, N. Y.

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Metal to be cleaned:

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SPECIALIZED OAKITE
INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

HOUSE TRAILER HARDWARE

(Continued from Page 27)

sion. It must be adaptable to varying thicknesses of door construction and must be well sealed against water seepage around the edges.

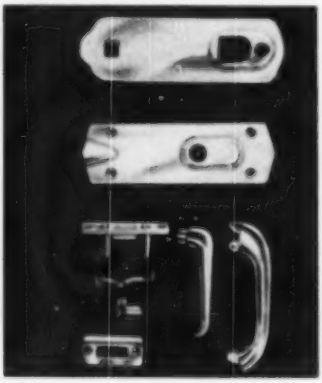
For the necessary strength, Bargman has specified zinc die castings which have high mechanical properties. At the same time, this alloy can be plated satisfactorily for appearance and corrosion protection.

The exterior escutcheon plate and handle are given a copper-nickel-chrome plate of the type used to protect and enhance automotive hardware. Interior surfaces require only nickel plating for improved appearance and protection against a limited atmospheric attack.

To keep out water, recesses formed on the under side offer pockets into which is applied a sealing compound so that when the escutcheons are assembled onto the door, a tight seal is formed all around. This feature would be more difficult to provide in a stamped escutcheon.

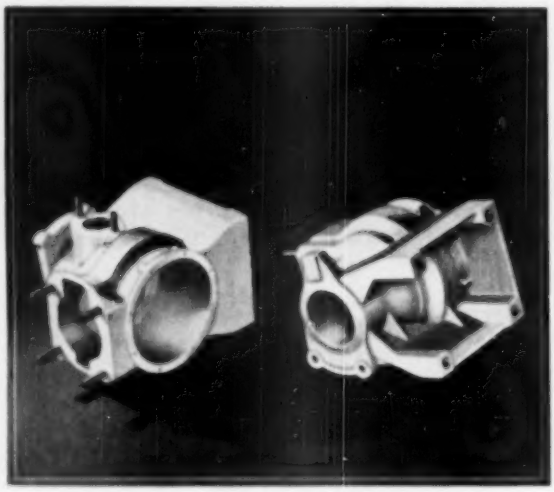
As can be seen from Figure 1, the interior and exterior escutcheons are assembled to the door by means of four long machine screws from the inside. Four countersunk cored holes through the interior plate mate perfectly with four hollow bosses on the exterior plate. Tapping of the blind holes in these bosses is the only machining for assembling. There are also several other cored holes to be tapped for mounting the working mechanism.

Hardware of this type is sold to manufacturers of house trailers, and cost is an important factor. The problem here has been to construct a dependable and attractive unit at a reasonable cost. By furnishing parts that are almost ready for assembly, the contract die caster saves the Bargman organization many dollars in labor and tool costs on production line.



Group of zinc base die castings used in the door latch for house trailers.

One of the outstanding features of this door hardware is its special locking arrangement. The door can be locked from the inside by means of a small lever, preventing anyone from entering. However, to open the door from the inside, one needs only to turn the handle in the normal fashion, and this unlocks the



"Cleveland" MOTORCYCLE ENGINE BLOCK

• The kind of service we render is the kind of service you want..... and get.

★

Every "Cleveland" Job Is Important

DIE CASTING DIVISION
The Cleveland Hardware & Forging Co.
Established 1911
3256 E. 79 ST. CLEVELAND 4, OHIO

door. This is a safety precaution to permit rapid exit in event of fire, and eliminates time lost fumbling for the latch.

Of the remaining parts which are die cast, there are two handles, a latch plate and striker plate, plus a special cam and an irregularly shaped link. These can all be used practically as cast, requiring only the trimming off of flash.

Notice, in Figure 3, the three irregularly shaped parts which could otherwise be produced only by fabricating separate components. The cam on a hollow shaft with a square hole through it could be brazed or soldered from two pieces, but would require several machining operations, an assembly, and a broaching operation.

Similarly, the two other pieces could be fabricated from stampings and tube stock, but involving greater production line processing. By using die castings here, investment in machine tools and assembly fixtures has been minimized.

VENDING MACHINES

(Continued from Page 14)

have had to be an assembly. In no case would it have been as economical as the die casting.

Cams are usually both difficult and expensive to machine and yet their irregular contours frequently lend themselves very well to die casting. Such is the case with the drive and control mechanism developed and manufactured by Viking Machine and Tool Co. for the popcorn dispenser which they produce. The three cams shown in figure 5 are all of somewhat similar shape but of different sizes. If they had had to be machined, costs would have been almost prohibitive. As zinc die castings, the only step required is a simple trimming operation and the strength and hardness of the parts is ample for the application.

In this same unit, the base frame is likewise die cast with all holes and bosses cast in place. The exact positioning of the various shafts and gears is dependent on how accurately these holes are aligned and the zinc die casting holds this alignment within close limits. Stiffening ribs are incorporated in the design so that no warpage or bending can take place in spite of the fairly thin sections. Being one piece, there is no assembly problem and variations in dimensions from casting to casting are minute.

Figure 7. Both castings have studs for attaching as an integral part of the casting.

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There must be a reason why so many highly discriminating manufacturers entrust *all* of their work to us. The reason is they *know* from experience that the finished job will meet every specification as to appearance, strength, accuracy and function. Furthermore, the price on either long or short runs is in line with their production and selling costs.

If you are located west of the Mississippi River we are in an excellent position to take care of your die casting requirements. Quotations made promptly.

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Although zinc is considerably heavier than either aluminum or magnesium, it can be cast in thinner sections which tends to compensate for its greater weight. Figure 6 shows part of the coin receiving unit used on the Electro cigarette merchandiser. Here is a complex casting with a section of only .055. No other means of fabrication could form such a part in one piece with so thin a section. Also in Figure 6 is a casting with a .11 section directly joined to a .38 section. Although it is not recommended practice, in this case the transition from one section to the other is abrupt with no fillets.

Figure 7 shows the reverse sides of the discharge slot and the trade mark from the Electro machine. In the case of the discharge slot, there is an average section thickness of .07 with the length and width 14 inches and 5 inches respectively. Notice that in both cases studs have been cast as an integral part on the surface for easy attachment to the machine. It would be impossible to produce these parts with the combination of thinness and studs in one operation by any other method.

In addition to the previously demonstrated advantages, zinc die castings can be finished by any commercial method.

Figure 8 shows a group of castings which have been copper-nickel-chrome plated. The

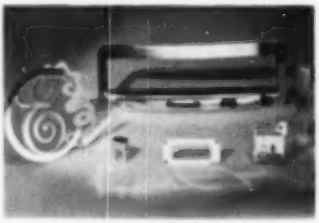


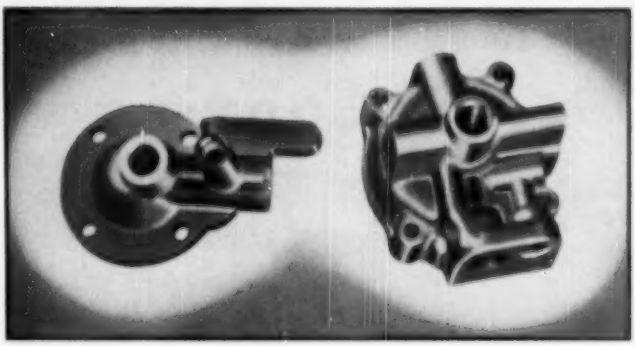
Figure 8. Zinc die castings can readily be given any commercial finish. The copper, nickel, chromium plate on the above castings has a high polish.

"C-8" trade mark in the center has been enameled in the stippled area in the center and the raised smooth portion plated. Because of the high degree of surface smoothness obtainable on zinc die castings in their as cast state, preparation for plating is greatly simplified.

It should also be pointed out that in Figure 8, the numerals 5, 10 and 25 on the coin slot and the words "coin return" on the coin return lever are cast in place requiring no operations.

Although aluminum or magnesium could be satisfactorily used in many of the applications, there are few reasons to justify this use. In a vending machine, weight is not a serious problem and die cast external parts almost invariably must be plated, which is difficult to do on castings of either metal. The fact that zinc die castings are so widely employed in such a variety of uses indicates the versatility of this material and the economy which results from its use. No other material and process of comparable cost can answer the many and varied requirements of the vending machine industry.

These *Accurate* DIE CASTINGS ARE "*Everything That the Name Implies*"



Carburetor parts of aluminum alloy. At left is fuel valve body. Other part is a carburetor float bowl. These die castings are used on outboard motors.

Here again ACCURATE DIE CASTINGS were the perfect solution to the problems of close tolerance, strength, uniformity—AND PRICE.

We have the plant facilities, the experience and the skill to supply WHAT you want, WHEN you want it and at an interesting quotation.

We welcome inquiries. Let's get acquainted. Tell us your needs.

ACCURATE DIE CASTING COMPANY

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NEWS OF THE INDUSTRY

NOMINATIONS FOR ANNUAL DIE CASTING AWARD ARE BEING RECEIVED

Nominations are now being received for the American Die Casting Institute Annual Doehler Award for outstanding contributions to the advancement of the die casting industry and process.

The Award Committee, consisting of the Board of Directors of the ADCI, will evaluate the nominations which may be submitted between January 1 and April 30.

The award will be made annually for the outstanding contribution to the die casting industry or art, in one of the following categories:

Technical Achievement, as measured by significant scientific contributions of a metallurgical or engineering nature relating to the die casting process, including casting alloys, die steels and die practices, finishing methods, machine design and related subjects;

Plant Operation, of a management or administrative nature, including safety procedures, devices and techniques, mechanical advances, and other accomplishments related to plant operation;

Other Activities, not primarily of scientific or operational nature that result in the enhancement of the reputation and acceptability of die castings.

Entries should be addressed to Award Committee, American Die Casting Institute, 366 Madison Ave., New York 17, N. Y.

PRESENT 1,000 NEW PRODUCTS IN SURVEY

More than 1,500 firms will be launching new products in 1950, ranging from simple household gadgets to complicated new precision machinery, a mid-century survey of the N. Y. Journal of Commerce discloses. To familiarize the businessman with these innovations he may be able to use, sell or be forced to compete against, a new 1950 compilation of over 1,000 "New Products and Services" has just been made available by the business publication. Described in full detail, this new study lists more than 750 of the leading manufacturers and their new 1950 innovations, cross-indexed by name and address as well as product. Copies of this fifth annual "New Products" study may be had at 50 cents each from the N. Y. Journal of Commerce, 63 Park Row, New York 15, N. Y.

ROTO-FINISH MOVES TO NEW PLANT IN KALAMAZOO

The Roto-Finish Company has transferred its operations from Sturgis, Michigan, to its new factory at Kalamazoo, Michigan.

One of the features of the plant is the sample processing department which is located in a specially designed area 25' wide by 80' long. The floor is built for proper drainage and all material handling is by an overhanging bridge crane system which services the complete installation.

All models of Roto-Finish equipment and supplies are used in this department in order to demonstrate the processes under ideal conditions and as nearly as possible like actual plant production operations. The sample processing department also has several new experimental machines which are constantly being used in the development of improved finishing methods. Adjacent to the sample processing department is an experimental laboratory.

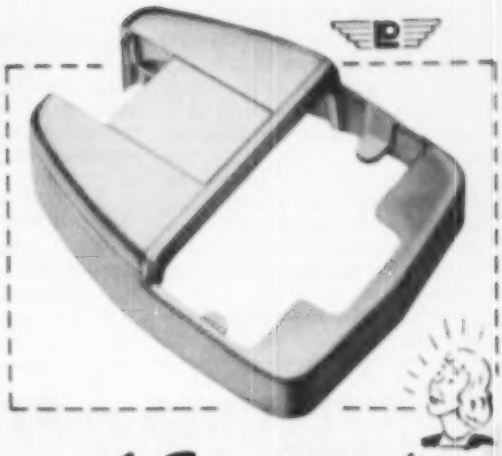
The sample processing office is used as a place for registration of incoming work, record data, issuing reports on the work actually done for prospective customers. Complete records are kept on all work processed. The remainder of the new plant is divided into executive offices, administrative offices, accounting, etc.

E. S. KOPECKI JOINS PENNSALT SPECIAL CHEMICALS DEPARTMENT

Ernest S. Kopecki has recently joined the Pennsylvania Salt Manufacturing Company as a sales service representative in the Special Chemicals Department, Joseph J. Duffy, Jr., manager of the Department, has announced.

Coming to Pennsalt with extensive experience in the field of metallurgy, Mr. Kopecki earned his degree of Bachelor of Science in chemical engineering at Marquette University and his Master's Degree in metallurgy at Carnegie Institute of Technology.

During the war he served with the Navy's Bureau of Ordnance in Washington and was separated from service as a lieutenant commander. Since then and until joining Pennsalt he has been metallurgical editor of *Iron Age*.



A Stenotypist's Dream!

(IT WEIGHS LESS THAN 14 OUNCES)

The LITEMETAL DICAST case shown above is an important component of the La Salle Stenotype Machine manufactured by the Quality Hardware and Machine Division, Continental Copper & Steel Industry, Inc., Chicago, Illinois, for Stenographic Machines, Inc. It must be strong, to enclose and protect a complex mechanism—yet it should be light, for the stenotypist must carry it with her—hold it in her lap during extended conferences, etc.

The answer is a magnesium pressure die casting, produced by LITEMETAL DICAST, INC., which is not only feather-light, but actually makes the machine quieter because of the "damping" quality of the magnesium alloy specified by our engineers.

Litemetal Dicast, Inc.

is an organization of specialists, men thoroughly experienced in the casting and machining of magnesium and aluminum alloys —the new metals of structural design.

Write today for literature and case histories of Litemetal Dicasting.

Quick action on inquiries.

LITEMETAL DICAST Inc.

A DIVISION OF HAYES INDUSTRIES

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PLANT AND EXECUTIVE OFFICES

MONARCH VICE PRESIDENT DIES; ACTIVE 36 YEARS

Harold J. Deutsch, vice president and director of the Monarch Aluminum Mfg. Co., Cleveland, Ohio, died on December 24, 1949.

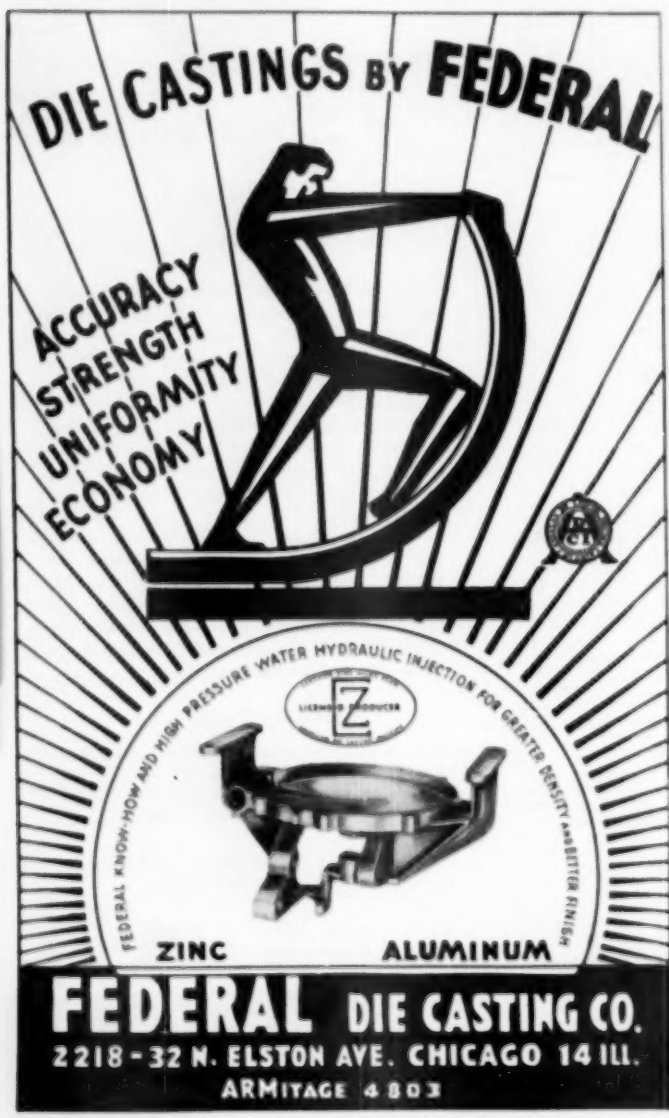
Mr. Deutsch had served as vice president since shortly after the company's incorporation under the present name and was active in its management for 36 years.

In 1913, Mr. Deutsch and his brother, Raymond Deutsch, founded the company under the name of Monarch Aluminum Ware Company. They were pioneers in the aluminum foundry industry and in the casting of aluminum cooking utensils.

P. L. FETT RETIRES FROM DOEHLER-JARVIS

Phil L. Fett has retired as general purchasing agent for the Doehler-Jarvis Corp., according to an announcement by F. J. Koegler, executive vice president. Mr. Fett's retirement is due to ill health.

Robert A. Bower, who has been serving as assistant general purchasing agent, has assumed responsibility for the details of the purchasing department. Mr. Koegler will act as director of purchases.



DIE-MOLD ANNOUNCES NEW PLANT MANAGER

Die-Mold Corp., 6619 W. Motor Avenue, Milwaukee 13, Wis., designers and builders of plastic molds, die casting dies and permanent molds, have appointed Adolph D. Mandl, formerly with Allied Chemical & Dye Corp. and General Aniline Film Corp., New York, as manager of their plant.

Sig Mandl continues as vice president and general manager. The Die-Mold Corp. also has announced a major expansion program with a substantial investment in new machines and equipment.

FOURTH INTERNATIONAL ELECTRODEPOSITION CONGRESS

The 37th Annual Convention of the American Electroplaters' Society which is to be held June 11 to 15, 1950, at the Hotel Statler, Boston, Mass., is also to be featured as the Fourth International Electrodeposition Conference with the collaboration of the Electrodepositors' Technical Society of England.

Inquiries regarding reservations and details of the convention may be obtained by writing to the convention committee chairman, Mr. Manson Glover, 376 Washington Street, Malden, Mass., or to the Society's headquarters, P. O. Box 168, Jenkintown, Pennsylvania.

Strong technical sessions are being planned including one session on "A.E.S. Research," symposia sessions on "Smoothing Processes in Metal Finishing," "Mechanical Finishing Processes," and "Advance in Electroforming, including the Graphic

Arts," and a fifth session on "Miscellaneous Plating Subjects."

Papers are being solicited for these technical sessions both within the U.S.A. and Canada as well as abroad. As has been the custom in the past, the Editorial Board of the A.E.S. will review all papers submitted in making the selection of those accepted for the program.

R. L. SHANNON PROMOTED BY DIVERSEY CORPORATION

R. L. Shannon, formerly a district manager in the Metal Industries Department, The Diversey Corporation, Chicago, has been named promotional manager. Announcement was made by W. E. Noyes, Diversey's general sales manager.

Mr. Shannon succeeds B. B. Button, who has been promoted

R. L. Shannon

to the position of special assistant to Mr. Noyes.

Mr. Shannon joined the Metal Industries Department six years ago, and after going through the sales training class was assigned as a field service representative in the North Chicago sales territory. Subsequently, he was advanced to field, then district manager, taking over supervision and management of the entire Chicago area for the Metal Industries Department.

FEDERATED PROMOTES A. REMSTEIN

The appointment of Abraham Remstein as a special representative in connection with the buying of white metal scrap and residues has been announced by Federated Metals.

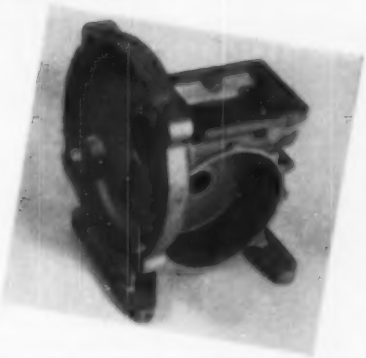
Since 1924 Mr. Remstein has been superintendent of the manufacture of white metal alloys at Federated's Newark plant. He has been associated with the company since 1914 and has served in various capacities in the buying and sales departments and most recently served as assistant to the plant manager at Newark.

JOINS CLEVELAND OFFICE

J. Robert Bunch has been appointed sales representative to assist J. D. Alexander in the Cleveland sales office of American Wheelabrator and Equipment Corp., Mishawaka, Ind.

Uniform Quality

in all Tool-Die Engineering die castings



Where you require uniform high quality, low cost Aluminum and Zinc Alloy die castings produced in a modern plant with modern facilities, call on the Tool-Die Engineering Company.

Our complete design and production services are available for consultation.

Wire or write today.

THE TOOL-DIE ENGINEERING CO.
CASTING DIVISION
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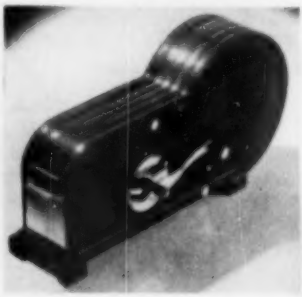
Gum Tape Machine



Gum tape machine, developed, designed, and styled by J. R. Ehrbar, for simplicity, economy and eye appeal.

EHRCO FACILITIES
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For Any Part or All of Your Die Casting Problems Consult with Us.

Ehrco DIE CASTING Service

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FROM BLUEPRINT TO FINISHED PART

YOUR BEST SOURCE FOR DIE CASTINGS IS

CENTRAL

- Comprehensive engineering and design service
- Wide range of aluminum or zinc alloys
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Custom PLASTIC Molders of Injection Parts
—Send blueprints for quotation—

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DIE CASTING and MFG. CO.

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H-VW-M ADVANCES CHEMISTS

The Hanson-Van Winkle-Munning Co., Matawan, N. J., announces the advancement of two members of its Laboratory staff, Dr. D. Gardner Foulke and Thomas J. Menzel.

Dr. D. Gardner Foulke has been appointed chief chemist in charge of analysis and customer service. He has held the post of process electrochemist for the past three years and continues to be responsible for a number of the company's special processes. His prior experience includes teaching, research, and work in the steel industry.

Dr. Foulke holds degrees from Juniata College and Rutgers University and is widely known in the electroplating field for his numerous articles and talks before the American Electroplaters' Society and others. He was awarded the American Electroplaters' Society Gold Medal in 1945 and is currently chairman of the Research Directing Sub-Committee for A. E. S. Project No. 2. He is a member of several technical and scientific societies.

Mr. Menzel has been advanced to the position of plating chemist. For the past several years he has been in charge of analytical work and customers' service work.

ESNA APPOINTS SORENSON

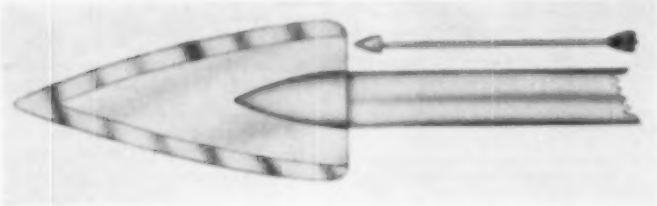
The Elastic Stop Nut Corporation of America, Union, N. J., has appointed Donald B. Sorenson of Milwaukee as sales engineer in charge of the Wisconsin and Minnesota area. Mr. Sorenson is a chemical engineering graduate of the University of Minnesota.

NAME WESTERN WAREHOUSE

The Dow Chemical Company has announced the appointment of Reliance Steel Company, 2068 E. 37th Street, Los Angeles, California, to warehouse magnesium wrought products effective January 9, 1950.

This move, Dow's first venture into warehousing of magnesium, is expected to be the forerunner of a nation-wide

DIE CAST MAGNESIUM TIP FOR HUNTING ARROW



A MAGNESIUM hunting arrow tip is being die cast for the Ken Hager Arrow Manufacturing Company, makers of Center-Shot Arrows. Archers had complained that the conventional broad head steel arrow tips made arrows too heavy at the nose.

The newly developed die cast magnesium tip assures a perfectly balanced arrow when mounted on an aluminum shaft. The tip is reported to give greater range, finer accuracy and the cost is comparable to that of the ordinary steel point.

A die cast notch for the arrow shaft has also been developed, replacing an aluminum machined part. Cost reduction is the primary advantage in this redesigned part.

service. The West Coast, as represented by Reliance Steel Company, was selected as the first area to be served in this manner because of the distance from the manufacturing mills at Midland, Michigan, and the difficulty of offering satisfactory service on small orders.

products were introduced to the sales staff for the first time.

These developments are the

S. B. HEPPENSTALL, SR. RETIRES AS CHAIRMAN

S. B. Heppenstall, Sr., chairman of the board of directors of Heppenstall Co., Pittsburgh, retired January 17 after 51 years of employment in this steel forgings plant, producers of die blocks, shear and clipper knives, tongs and forgings.

In announcing the retirement, R. B. Heppenstall, president, said the board chairmanship would remain vacant for the immediate future.

COWLES CONDUCTS METAL CLEANER CLINIC

"New Products for Better Cleaning" was the theme of a recent sales clinic conducted by Cowles Chemical Company at its general offices in Cleveland, Ohio. All Cowles technical men in the Metal Cleaner Department participated in the three-day session at which several new

DIE CASTINGS

ALUMINUM OR ZINC

☆

C. M. GREY MFG. CO.

QUALITY PRODUCTS SINCE 1910

SEND BLUEPRINTS OR SAMPLES FOR QUOTATIONS

358 CENTRAL AVENUE
EAST ORANGE, N. J.

"Since 1930"

Presenting

New and Expanded Plant Facilities for Improved Service on Zinc and Aluminum Die Castings of Outstanding Superiority.

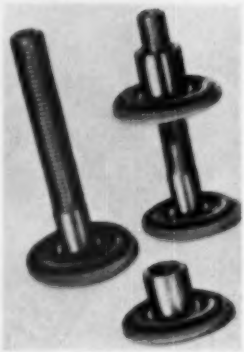
We would welcome the opportunity to quote on your requirements.

ADVANCE TOOL and DIE CASTING CO.
3764 NORTH HOLTON STREET • MILWAUKEE 12, WISCONSIN

Do you know?

THESE DIE CASTINGS CUT COSTS 57%

By redesigning these inner-and-outer hand wheels from machined bronze sand castings to zinc alloy die castings, our engineers cut costs 57% per unit. Costs were still further reduced by eliminating the need of a third wheel. The threaded steel inserts, cast in place, provide superior wearing qualities and eliminate replacement costs.



Perhaps we can save you money in the manufacture of your product. We've had more than 10 years' experience in designing and producing die castings. Our facilities include the most modern high pressure equipment for precision production of zinc or aluminum die castings.

Just send us a sample or blueprint and we will be happy to give you our suggestions and cost estimates without obligation.

OLDEST DIE CASTER IN UPPER MIDWEST

Licensed Producer
Certified Zinc Die Casting Plan

TWIN CITY DIE CASTINGS COMPANY

Talmage & 33rd Aves. S. E.
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result of many months of intensive research at the company's research and development laboratory at Syracuse, New York. It is expected that the first of the new products will be offially announced to the trade within the next few weeks. Technical discussions were led by Dr. C. W. MacMullen, technical director, and Clarence G. Ozar of the Metal Cleaner Service laboratory.

PENNSALT NAMES NEW CHICAGO MANAGER

John C. Hampson, former Indiana field representative for the Pennsylvania Salt Manufacturing Company's Special Chemicals Department, has been named sales manager for the department's newly-formed Chicago district, it has been announced by Joseph J. Duffy, Jr., departmental manager of sales.

The new sales district, with offices at 20 N. Wacker Drive, Chicago, will include the present Wisconsin, Illinois, Indiana and Missouri territories.

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One Harvill H.D. 102 high pressure die casting machine with oil hydraulic system, maximum casting capacity 6.37 lbs. aluminum, with all accessories required for an operating unit, including one H.A. 3320 holding furnace, like new, operated less than 100 hrs., located in Alabama, open for inspection, price to sell. Write or wire Castings Service, Inc., 1534 Seventh Ave., West, Birmingham 4, Ala.; telephone 6-8197.

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Used Reed-Prentice No. 2 or JG aluminum die casting machines or equivalent. Reply to Box 2250, Die Castings Magazine.

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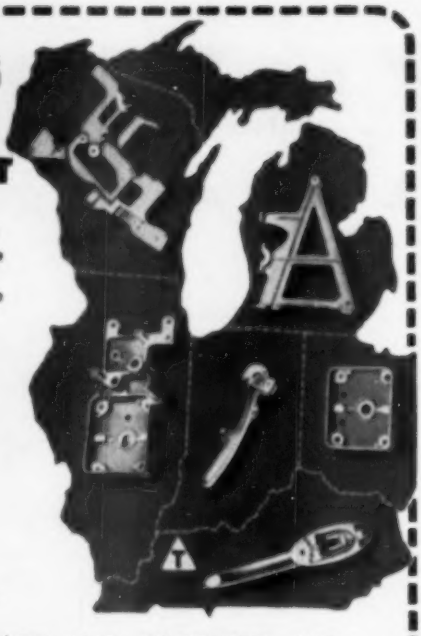

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INSTALLS SALT SPRAY TEST

The United States Testing Company, Inc., Hoboken, N. J., has announced the installation of a new salt spray corrosion test cabinet.

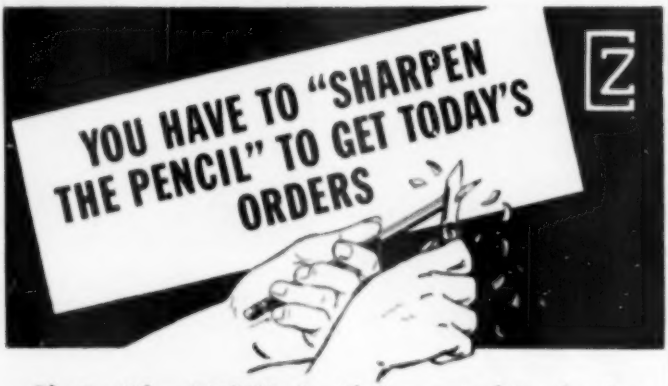
Salt spray testing is used by electroplating companies and buyers of coated or plated metal and metal parts, paint or lacquer laboratories, preservative oil and grease compounders. These tests are designed to determine the corrosion resistance qualities of electroplated or coated metal, alloys, metal parts, lacquered or painted samples, etc.

LETTERS TO THE EDITOR

(Continued from Page 8)

die castings for indoor service."

Clear alkyd type baking lac-



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quers or vinyl type coatings should be investigated. While the clear alkyd lacquers will adhere satisfactorily, there is a tendency toward yellow color upon baking.

In most cases, approved baking type primers should be used. Recommended paint schedules for magnesium alloys were included in charts accompanying the above article, which we have forwarded. Also, we have sent tear sheets of the "Production Clinic" for May 1947, containing much data on polishing procedures for magnesium alloys.

We also suggest that you obtain copies of a booklet on finishing magnesium published by the Dow Chemical Company, Midland, Mich., and an article, "Fundamentals in the Finishing of Magnesium" contained in the May 1949 issue of "The Magazine of Magnesium" published by Brooks & Perkins, Inc., Detroit.

Some information on bonding magnesium surfaces with resin-base adhesives is contained in a book, "Designing with Magnesium," published by American Magnesium Corp., Pittsburgh, Pa. This book also has a chapter on damping capacity, vibration and acoustic properties of magnesium.—Ed.

STANFORD UNIVERSITY DEAN TO RECEIVE IRE AWARD

Professor Frederick E. Terman, Dean of the School of Engineering of Stanford University, will be awarded the 1950 Medal of Honor given by The Institute of Radio Engineers at the annual IRE convention to be held March 6 to 9 at the Hotel Commodore and Grand Central Palace, New York City.

The Medal of Honor, which is the Institute's highest award, is given in recognition of distinguished service rendered through substantial and important advancement in the science and art of radio communication.

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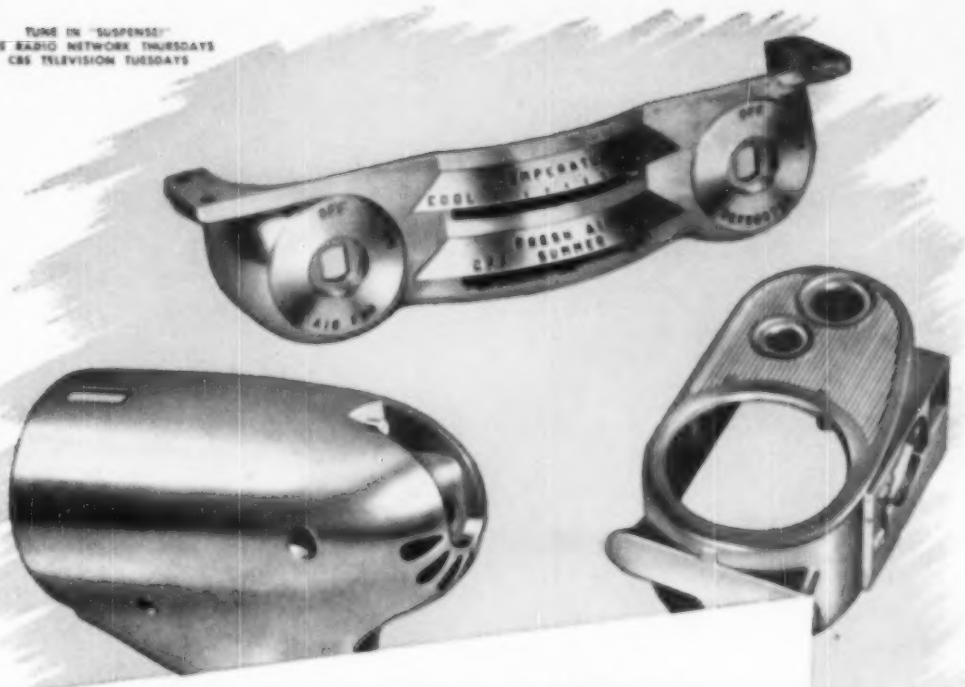

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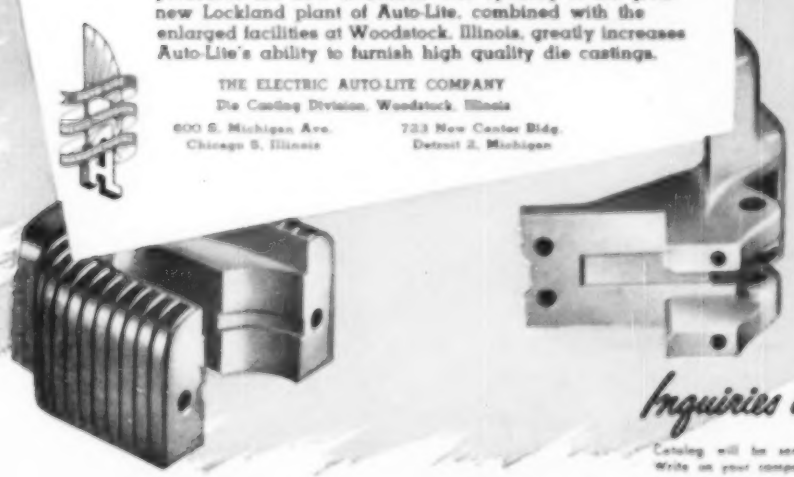
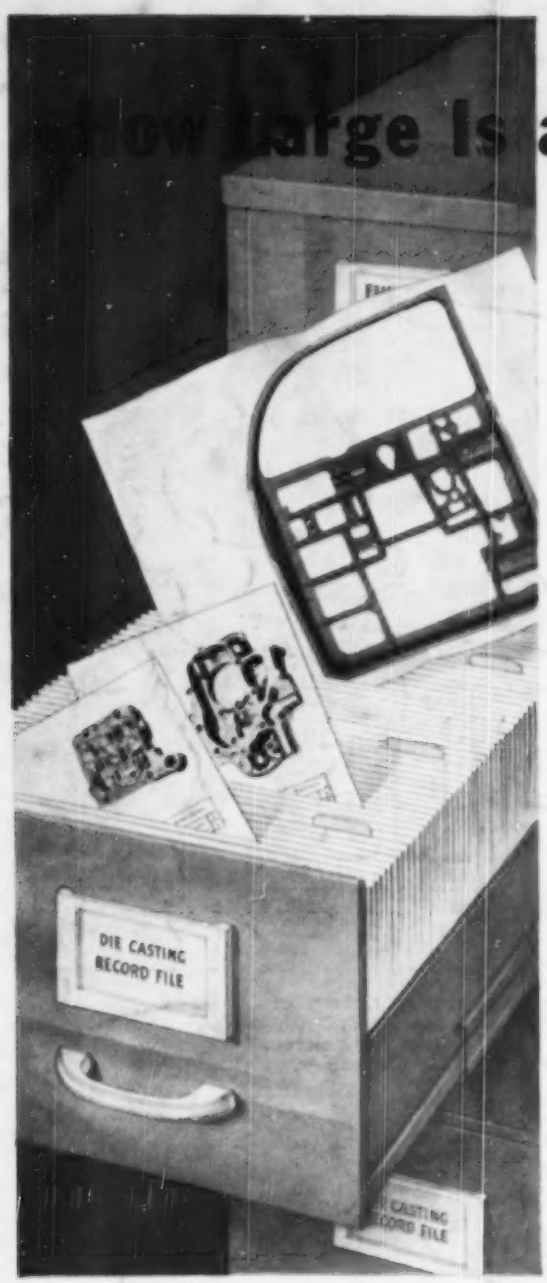


Inquiries invited

Catalog will be sent on request. Write on your company letterhead.



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